

# Andhra Pradesh State Council of Higher Education

## Notations :

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

<b>Question Paper Name :</b>	Mechanical Engineering 22nd July 2022 Shift 2
<b>Duration :</b>	180
<b>Total Marks :</b>	200
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No

## Mathematics

Section Id :	722544112
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 1 Question Id : 7225445602 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $A = \begin{bmatrix} \cos \theta & -\sin \theta \\ \sin \theta & \cos \theta \end{bmatrix}$  then  $A^T + A = I_2$  if

Options :

1. ✘  $\theta = n\pi, n \in Z$

2. ✘  $\theta = (2n+1)\frac{\pi}{2}, n \in Z$

3. ✔  $\theta = 2n\pi \pm \frac{\pi}{3}, n \in Z$

4. ✘  $\theta = (2n+1)\frac{\pi}{4}, n \in Z$

Question Number : 2 Question Id : 7225445603 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If for the matrix  $A$ ,  $A^3 = I$  then  $A^{-1} =$

Options :

1. ✓  $A^2$
2. ✗  $A^3$
3. ✗  $A$
4. ✗  $A^4$

Question Number : 3 Question Id : 7225445604 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  $\lambda$  for which the system of equations  
 $x + y + z = 6$  ,  $x + 2y + 3z = 10$  ,  $x + 2y + \lambda z = 12$  is inconsistent is

Options :

1. ✗  $\lambda = 1$
2. ✗  $\lambda = 2$
3. ✗  $\lambda = -2$

4. ✓  $\lambda = 3$

**Question Number : 4 Question Id : 7225445605 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$  then the value of  $|adj A|$  is

**Options :**

1. ✗  $a^{27}$

2. ✗  $a^9$

3. ✓  $a^6$

4. ✗  $a^2$

**Question Number : 5 Question Id : 7225445606 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $A + 2B = \begin{bmatrix} 1 & 2 & 0 \\ 6 & -3 & 3 \\ -5 & 3 & 1 \end{bmatrix}$  and  $2A - B = \begin{bmatrix} 2 & -1 & 5 \\ 2 & -1 & 6 \\ 0 & 1 & 2 \end{bmatrix}$  then  $\text{tr}(A) - \text{tr}(B)$  value equal

to

Options :

1. ✘ 0

2. ✘ 1

3. ✔ 2

4. ✘ 3

Question Number : 6 Question Id : 7225445607 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{2x+3}{(x+1)(x-3)} = \frac{a}{x+1} + \frac{b}{x-3} \text{ then } 2a+3b =$$

Options :

1. ✘ 14

2. ✘ 12

3. ✓  $25/4$ 4. ✗  $-12$ 

**Question Number : 7 Question Id : 7225445608 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 partial fractions of  $\frac{3x^2 + 70x + 93}{(x-1)^4}$  is

**Options :**

1. ✓ 3

2. ✗ 4

3. ✗ 5

4. ✗ 2

**Question Number : 8 Question Id : 7225445609 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Given that  $A = \sin^2 \theta + \cos^4 \theta$ , then for all real values of  $\theta$

**Options :**

1. ✘  $1 \leq A \leq 2$

2. ✔  $\frac{3}{4} \leq A \leq 1$

3. ✘  $\frac{13}{16} \leq A \leq 1$

4. ✘  $\frac{3}{4} \leq A \leq \frac{13}{16}$

**Question Number : 9 Question Id : 7225445610 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If  $\tan \theta = -\frac{4}{3}$ , then  $\sin \theta =$*

**Options :**

1. ✘  $-\frac{4}{5}$  but not  $\frac{4}{5}$

2. ✔  $-\frac{4}{5}$  or  $\frac{4}{5}$

3. ✘  $\frac{4}{5}$  but not  $-\frac{4}{5}$

4. ✘  $-\frac{3}{5}$  but not  $\frac{3}{5}$

Question Number : 10 Question Id : 7225445611 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*

$$\sin x - 3 \sin 2x + \sin 3x = \cos x - 3 \cos 2x + \cos 3x \text{ is}$$

Options :

1. ✘  $n\pi + \frac{\pi}{8}$

2. ✔  $\frac{n\pi}{2} + \frac{\pi}{8}$

3. ✘  $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$

4. ✘  $2n\pi + \cos^{-1} \frac{3}{2}$



**Question Number : 11 Question Id : 7225445612 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If  $x, y, z$  are in AP and  $\tan^{-1} x, \tan^{-1} y$  and  $\tan^{-1} z$  are also in AP then*

**Options :**

1. ✓  $x = y = z$

2. ✗  $2x = 3y = 6z$

3. ✗  $6x = 3y = 2z$

4. ✗  $6x = 4y = 3z$

**Question Number : 12 Question Id : 7225445613 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*If  $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$  then  $x =$*

**Options :**

1. ✓  $\frac{1}{6}$

2. ✘  $\frac{1}{3}$

3. ✘  $\frac{1}{2}$

4. ✘  $\frac{3}{2}$

Question Number : 13 Question Id : 7225445614 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The sides of a triangle are in the ratio  $1 : \sqrt{3} : 2$  then the angles of the triangle are in the ratio

Options :

1. ✘ 1:3:5

2. ✘ 2:3:2

3. ✘ 3:2:1

4. ✔ 1:2:3

Question Number : 14 Question Id : 7225445615 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Let  $\cos(\alpha + \beta) = \frac{4}{5}$  and  $\sin(\alpha - \beta) = \frac{5}{13}$  where  $0 < \alpha, \beta \leq \frac{\pi}{4}$ , then  $\tan 2\alpha =$

Options :

1. ✘  $\frac{19}{12}$

2. ✘  $\frac{20}{7}$

3. ✘  $\frac{25}{16}$

4. ✔  $\frac{56}{33}$

Question Number : 15 Question Id : 7225445616 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $1 + \sin x + \sin^2 x + \sin^3 x + \dots \infty = 4 + 2\sqrt{3}$ ,  $0 < x < \pi$ , then  $x =$

Options :

1. ✘  $\frac{\pi}{6}$

2. ✘  $\frac{\pi}{4}$

3. ✔  $\frac{2\pi}{3}$

4. ✘  $\frac{3\pi}{4}$

Question Number : 16 Question Id : 7225445617 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The angles of a triangle are in the ratio 3:5:10 then the ratio of the smallest side to the greatest side is

Options :

1. ✘  $1 : \sin 10^\circ$

2. ✘  $1 : 2\sin 10^\circ$

3. ✘  $1 : \cos 10^\circ$

4. ✔  $1 : 2\cos 10^\circ$

Question Number : 17 Question Id : 7225445618 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$  then  $\cos^{-1} x + \cos^{-1} y =$

Options :

1. ✘  $\frac{2\pi}{3}$

2. ✔  $\frac{\pi}{3}$

3. ✘  $\frac{\pi}{6}$

4. ✘  $\pi$

Question Number : 18 Question Id : 7225445619 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The conjugate of a complex number is  $\frac{1}{i-1}$ , then that complex number is

Options :

1. ✓  $\frac{-1}{i+1}$

2. ✗  $\frac{1}{i-1}$

3. ✗  $\frac{-1}{i-1}$

4. ✗  $\frac{1}{i+1}$

**Question Number : 19 Question Id : 7225445620 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  $\frac{(\sin \pi/8 + i \cos \pi/8)^8}{(\sin \pi/8 - i \cos \pi/8)^8} =$

**Options :**

1. ✗  $-1$

2. ✗  $0$

3. ✓ 1

4. ✗  $2i$ 

**Question Number : 20 Question Id : 7225445621 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

*The lines  $2x - 3y - 5 = 0$  and  $3x - 4y = 7$  are diameters of a circle of area  $49\pi$  sq.units, then the equation of the circle is*

**Options :**

1. ✗  $x^2 + y^2 + 2x - 2y - 62 = 0$

2. ✗  $x^2 + y^2 + 2x - 2y - 47 = 0$

3. ✓  $x^2 + y^2 - 2x + 2y - 47 = 0$

4. ✗  $x^2 + y^2 - 2x + 2y - 62 = 0$

**Question Number : 21 Question Id : 7225445622 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the point  $(a, -a)$  lies inside the circle  $x^2 + y^2 - 4x + 2y - 8 = 0$ , then 'a' lies in the interval

Options :

1. ✓  $(-1, 4)$

2. ✗  $(-\infty, -1)$

3. ✗  $(4, \infty)$

4. ✗  $[-1, 4]$

Question Number : 22 Question Id : 7225445623 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The focus of the parabola  $y^2 - 4y - 8x + 4 = 0$  is

Options :

1. ✗  $(1, 1)$

2. ✗  $(1, 2)$

3. ✗  $(2, 1)$



4. ✓ (2, 2)

Question Number : 23 Question Id : 7225445624 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The equation  $\frac{x^2}{10-a} + \frac{y^2}{4-a} = 1$  represents an ellipse if

Options :

1. ✓  $a < 4$ 2. ✗  $a > 4$ 3. ✗  $4 < a < 10$ 4. ✗  $a > 10$ 

Question Number : 24 Question Id : 7225445625 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The vertices of the hyperbola  $9x^2 - 16y^2 - 36x + 96y - 252 = 0$ , are

Options :

1. ✗ (6,3) and (-6,3)

2. ✓  $(6,3)$  and  $(-2,3)$

3. ✗  $(-6,3)$  and  $(-6,-3)$

4. ✗  $(0, \pm \frac{2}{3})$

Question Number : 25 Question Id : 7225445626 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

*The eccentricity of the hyperbola with latus rectum 12 and semi conjugate axis  $2\sqrt{3}$  is*

Options :

1. ✓ 2

2. ✗ 3

3. ✗  $\sqrt{3}/2$

4. ✗  $2\sqrt{3}$

Question Number : 26 Question Id : 7225445627 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The side of an equilateral triangle expands at the rate of 2 cm/sec, the rate of increase of its area when each side is 10 cm (in  $\text{cm}^2/\text{sec}$ )

Options :

1. ✘  $10\sqrt{2}$
2. ✘  $10\sqrt{3}$
3. ✔ 10
4. ✘ 5

Question Number : 27 Question Id : 7225445628 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(x+y) = f(x) f(y)$ , for all  $x, y$ .  $f(5) = 2$ ,  $f'(0) = 3$ , then  $f'(5) =$

Options :

1. ✔ 6
2. ✘ 2
3. ✘ 3

4. ✘ 5

Question Number : 28 Question Id : 7225445629 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\lim_{x \rightarrow \infty} \left[ \frac{x^2 + 2x - 1}{2x^2 - 3x - 2} \right]^{\frac{2x+1}{2x-1}} \text{ is equal to}$$

Options :

1. ✘ 0

2. ✘  $\infty$ 

3. ✔ 1/2

4. ✘ 1/3

Question Number : 29 Question Id : 7225445630 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\lim_{x \rightarrow 0} \frac{\sin^2 mx}{\tan^2 nx} \text{ is equal to}$$

Options :

1. ✘ m/n

2. ✘  $m^2 \cdot n^2$

3. ✔  $m^2/n^2$

4. ✘  $n^2/m^2$

Question Number : 30 Question Id : 7225445631 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $f(x) = |x^2 - 5x + 6|$  then  $f'(x) =$

Options :

1. ✘  $2x - 5$  for  $2 < x < 3$

2. ✔  $5 - 2x$  for  $2 < x < 3$

3. ✘  $2x - 5$  for  $x > 2$

4. ✘  $5 - 2x$  for  $x < 3$

Question Number : 31 Question Id : 7225445632 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $y = \log_y x$ , then  $\frac{dy}{dx} =$

Options :

$$\frac{1}{x(1 + \log y)}$$

1. ✓

$$\frac{1}{x + \log y}$$

2. ✗

$$\frac{1}{\log x(1 + y)}$$

3. ✗

$$\frac{1}{y + \log x}$$

4. ✗

Question Number : 32 Question Id : 7225445633 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 tangents to the curve  $y = x^2 - 5x + 6$  at the points (2,0) and (3,0) is

Options :

1. ✘  $\frac{\pi}{3}$

2. ✔  $\frac{\pi}{2}$

3. ✘  $\frac{\pi}{6}$

4. ✘  $\frac{\pi}{4}$

Question Number : 33 Question Id : 7225445634 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

*If errors of 1% is made in the base radius and height of a cylinder then the percentage error in its volume is*

Options :

1. ✘ 1%

2. ✘ 2%

3. ✔ 3%

4. ✘ 4%

Question Number : 34 Question Id : 7225445635 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 'a' for which the function  $f(x) = a \sin x + \frac{1}{3} \sin 3x$

has an extremum at  $x = \frac{\pi}{3}$  is

Options :

1. ✘ 1

2. ✘ -1

3. ✘ 0

4. ✔ 2

Question Number : 35 Question Id : 7225445636 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $u = x^y$  then  $\frac{\partial^2 u}{\partial x \partial y} =$

Options :



1. ✘  $x^{y-1}(1+x \log y)$

2. ✘  $y^{x-1}(1+y \log x)$

3. ✔  $x^{y-1}(1+y \log x)$

4. ✘  $x^{y+1}(1-y \log x)$

Question Number : 36 Question Id : 7225445637 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

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

Options :

1. ✘  $2e^{\sin^{-1}x} + c$

2. ✔  $e^{\sin^{-1}x} + c$

3. ✘  $e^{\sin x} + c$

4. ✘  $e^{\cos^{-1}x} + c$

Question Number : 37 Question Id : 7225445638 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\text{If } \int \frac{4x+1}{x^2+3x+2} dx = a \log |x+1| + b \log |x+2| + C, \text{ then}$$

Options :

1. ✘  $a = b$

2. ✔  $a + b = 4$

3. ✘  $a = 2b$

4. ✘  $b = 2a$

Question Number : 38 Question Id : 7225445639 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int \frac{\cos 2x}{(\sin x + \cos x)^2} dx =$$

Options :

1. ✘  $-\frac{1}{\sin x + \cos x} + c$

2. ✓  $\log |\sin x + \cos x| + c$

3. ✗  $\log |\sin x - \cos x| + c$

4. ✗  $(\sin x + \cos x)^2 + c$

**Question Number : 39 Question Id : 7225445640 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $\int f(x)dx = 2(f(x))^3 + C$  then  $f(x) =$

**Options :**

1. ✗  $\frac{x}{2}$

2. ✗  $x^3$

3. ✗  $\frac{1}{\sqrt{x}}$

4. ✓  $\sqrt{\frac{x}{3}}$

**Question Number : 40 Question Id : 7225445641 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $\int e^{ax} \cos bx \, dx = \frac{e^{2x}}{29} f(x) + C$ , then  $f''(x) =$

**Options :**

1. ✘  $29f(x)$

2. ✘  $-29f(x)$

3. ✘  $25f(x)$

4. ✔  $-25f(x)$

**Question Number : 41 Question Id : 7225445642 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  $x$  in  $\int \frac{1}{\sqrt{2} t \sqrt{t^2 - 1}} dt = \frac{\pi}{2}$  is

**Options :**

1. ✘  $\frac{\sqrt{3}}{2}$

2. ✘  $2\sqrt{2}$

3. ✘ 2

4. ✔  $-\sqrt{2}$

Question Number : 42 Question Id : 7225445643 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

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

Options :

1. ✔  $\frac{\pi^3}{24}$

2. ✘  $\frac{\pi^3}{48}$

3. ✘  $\frac{\pi^3}{64}$

4. ✘  $\frac{\pi^3}{12}$

Question Number : 43 Question Id : 7225445644 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 a polynomial of degree 2 satisfying  $f(0) = 1$ ,

$f'(0) = -2$  and  $f''(0) = 6$  then  $\int_{-1}^2 f(x) dx =$

Options :

1. ✘ 6

2. ✘ 0

3. ✔ 9

4. ✘ -8

Question Number : 44 Question Id : 7225445645 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The degree of the differential equation  $a^2 \frac{d^2 y}{dx^2} = \left[ 1 + \left( \frac{dy}{dx} \right)^2 \right]^{3/2}$  is

Options :

1. ✔ 2

2. ✘ 1

3. ✖ 3

4. ✖ 4

Question Number : 45 Question Id : 7225445646 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$\log\left(\frac{y}{x}\right) = cx$ , where  $c$  is arbitrary constant is a solution of the differential equation

Options :

1. ✔  $\log\left(\frac{y}{x}\right) = \frac{x}{y} \frac{dy}{dx} - 1$

2. ✖  $\log\left(\frac{x}{y}\right) = \frac{x}{y} \frac{dy}{dx} - 1$

3. ✖  $\log\left(\frac{x}{y}\right) = \frac{y}{x} \frac{dy}{dx} + 1$

4. ✖  $\frac{dy}{dx} = 1 + \log\left(\frac{y}{x}\right)$

Question Number : 46 Question Id : 7225445647 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The solution of the differential equation  $\cos\theta dr - r\sin\theta d\theta = 0$  is

Options :

1. ✓  $r \cos\theta = c$ ,  $c$  – arbitrary constant
2. ✗  $r \sin\theta = c$ ,  $c$  – arbitrary constant
3. ✗  $r \cos\theta + r \sin\theta = c$ ,  $c$  – arbitrary constant
4. ✗  $r^2 \cos 2\theta = c$ ,  $c$  – arbitrary constant

Question Number : 47 Question Id : 7225445648 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The degree of  $\left(\frac{d^2y}{dx^2}\right)^2 + \left(\frac{dy}{dx}\right)^2 = x \sin \frac{dy}{dx}$  is

Options :

1. ✗ 1
2. ✗ 2
3. ✗ 3



Not defined

4. ✓

Question Number : 48 Question Id : 7225445649 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The complimentary function of the differential equation  $\frac{d^2y}{dx^2} + 4\frac{dy}{dx} + 3y = e^{2x}$  is

Options :

1. ✘  $x = c_1e^{-y} + c_2e^{-3y}$ ,  $c_1, c_2$  – arbitrary constants

2. ✓  $y = c_1e^{-x} + c_2e^{-3x}$ ,  $c_1, c_2$  – arbitrary constants

3. ✘  $y = c_1e^x + c_2e^{3x}$ ,  $c_1, c_2$  – arbitrary constants

4. ✘  $x = c_1e^y + c_2e^{3y}$ ,  $c_1, c_2$  – arbitrary constants

Question Number : 49 Question Id : 7225445650 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  $(D^2 + 4)y = \cos 2x$  is

Options :

1. ✘  $-\frac{1}{2}x \sin 2x$

2. ✘  $\frac{1}{2}x \sin 2x$

3. ✘  $-\frac{1}{4}x \cos 2x$

4. ✔  $\frac{1}{4}x \sin 2x$

**Question Number : 50 Question Id : 7225445651 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 equation  $x^2y dx - (x^3 + y^3)dy = 0$  is

**Options :**

1. ✘  $-\frac{1}{x^4}$

2. ✘  $\frac{1}{x^4}$

3. ✘  $\frac{1}{y^4}$

4. ✓  $-\frac{1}{y^4}$

## Physics

Section Id :	722544113
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

Question Number : 51 Question Id : 7225445652 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Parsec is the unit of

Options :

1. ✘ Time
2. ✓ Distance
3. ✘ Frequency
4. ✘ Angular acceleration

Question Number : 52 Question Id : 7225445653 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Among the following pairs, which pair does not have identical dimensions

Options :

1. ✓ Moment of inertia and moment of a force
2. ✗ Work and torque
3. ✗ Angular momentum and Planck's constant
4. ✗ Impulse and momentum

Question Number : 53 Question Id : 7225445654 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

One of the two forces is double the other and their resultant is equal to the greater force.

The angle between them is

Options :

1. ✗  $\cos^{-1}(1/2)$
2. ✗  $\cos^{-1}(-1/2)$
3. ✗  $\cos^{-1}(1/4)$

4. ✓  $\cos^{-1}(-1/4)$

**Question Number : 54 Question Id : 7225445655 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If three vectors  $\vec{A} = \hat{i} - 2\hat{j} + 3\hat{k}$ ,  $\vec{B} = x\hat{i} + 3\hat{k}$  and  $\vec{C} = 7\hat{i} + 3\hat{j} - 11\hat{k}$  are coplanar, then the value of  $x$  is

**Options :**

1. ✗  $36/21$

2. ✓  $-51/13$

3. ✗  $51/32$

4. ✗  $-36/21$

**Question Number : 55 Question Id : 7225445656 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 allowed to fall from a height of 100 m. The time taken for the first 50 m is  $t_1$  and for the remaining 50 m is  $t_2$ , then

**Options :**

1. ✗  $t_1 = t_2$

2. ✓  $t_1 > t_2$

3. ✗  $t_1 < t_2$

4. ✗ Depends upon the mass

**Question Number : 56 Question Id : 7225445657 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two stones are projected with the same speed but making different angles with the horizontal. Their horizontal ranges are equal. The angle of projection of one stone is  $\pi/3$  and the maximum height reached by it is 102 meters. Then the maximum height reached by the other in meters is

**Options :**

1. ✗ 336

2. ✗ 224

3. ✗ 56

4. ✓ 34

**Question Number : 57 Question Id : 7225445658 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cricket ball is thrown at a speed of  $28 \text{ ms}^{-1}$  in a direction  $30^\circ$  above the horizontal. The time taken by the ball to return to the same level in seconds is

**Options :**

1. ✓ 2.9

2. ✗ 3.9

3. ✗ 1.9

4. ✗ 2

**Question Number : 58 Question Id : 7225445659 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The maximum height of a projectile is half of its range on the horizontal. If the velocity of the projection is  $u$ , then its range on the horizontal is

**Options :**

1. ✗  $\frac{2u^2}{5g}$

2. ✗  $\frac{3u^2}{5g}$

3. ✘  $\frac{u^2}{g}$

4. ✔  $\frac{4u^2}{5g}$

**Question Number : 59 Question Id : 7225445660 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cubical block rests on an inclined plane of coefficient of friction  $\mu = \frac{1}{\sqrt{3}}$ . What should be the angle of inclination so that the block just slides down the inclined plane?

**Options :**

1. ✔  $30^\circ$

2. ✘  $60^\circ$

3. ✘  $45^\circ$

4. ✘  $90^\circ$

**Question Number : 60 Question Id : 7225445661 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



For the equilibrium of a body on an inclined plane of inclination  $45^\circ$ , the coefficient of static friction will be

Options :

1. ✓ Greater than one
2. ✗ Zero
3. ✗ Less than one
4. ✗ Less than zero

Question Number : 61 Question Id : 7225445662 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The displacement  $x$  and time  $t$  for a particle are related to each other as  $t = \sqrt{x} + 3$ . The work done in first six seconds of its motion is

Options :

1. ✗ 6 J
2. ✓ Zero
3. ✗ 4 J

4. ✘ 2 J

Question Number : 62 Question Id : 7225445663 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A particle move with a velocity  $v = (5\hat{i} - 3\hat{j} + 6\hat{k})$  m/s under the influence of a constant force  $\vec{F} = 10\hat{i} + 10\hat{j} + 20\hat{k}$ . The instantaneous power applied to the particle is

Options :

1. ✘ 200 J/sec

2. ✘ 40 J/sec

3. ✔ 140 J/sec

4. ✘ 170 J/sec

Question Number : 63 Question Id : 7225445664 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The main source of solar energy is

Options :

Nuclear fission

1. ✘

2. ✓ Nuclear fusion

3. ✗ Gravitational contraction

4. ✗ Combustion

**Question Number : 64 Question Id : 7225445665 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The particle executing the simple harmonic motion passes through the mean position. It has

**Options :**

1. ✗ Minimum kinetic energy and maximum potential energy

2. ✓ Maximum kinetic energy and minimum potential energy

3. ✗ Maximum kinetic energy and maximum potential energy

4. ✗ Minimum kinetic energy and minimum potential energy

**Question Number : 65 Question Id : 7225445666 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simple pendulum has a time period  $T_1$  on the earth's surface and  $T_2$  at a height of  $R$  above the earth's surface, where  $R$  is the radius of the earth. The value of  $T_2/T_1$  is

Options :

1. ✘ 1
2. ✘ 4
3. ✘  $\sqrt{2}$
4. ✔ 2

Question Number : 66 Question Id : 7225445667 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 characteristic of musical sound?

Options :

1. ✘ Quality
2. ✘ Pitch
3. ✔ Wavelength
4. ✘ Loudness

**Question Number : 67 Question Id : 7225445668 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Doppler shift in frequency does not depend upon

**Options :**

1. ✘ The actual frequency of the wave
2. ✔ The distance of the source from the listener
3. ✘ The velocity of the source
4. ✘ The velocity of the observer

**Question Number : 68 Question Id : 7225445669 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Inaudibility limit is around

**Options :**

1. ✘ One-hundredth of the initial intensity
2. ✘ One-tenth of the initial intensity

3. ✘ One-thousandth of the initial intensity
4. ✔ One-millionth of the initial intensity

**Question Number : 69 Question Id : 7225445670 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An ideal gas at  $27^{\circ}\text{C}$  is compressed adiabatically to  $8/27$  of its original volume. If  $\gamma = 5/3$ , then the rise in temperature is

**Options :**

1. ✘ 450K
2. ✔ 375K
3. ✘ 225K
4. ✘ 405K

**Question Number : 70 Question Id : 7225445671 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A system is provided with 200 calories of heat and the work done by the system on the surrounding is 40 J. Then its internal energy

**Options :**

1. ✘ Increases by 600 J
2. ✘ Decreases by 800 J
3. ✔ Increases by 800 J
4. ✘ Decreases by 50J

Question Number : 71 Question Id : 7225445672 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The temperature of  $n$  moles of an ideal gas is increased from  $T$  to  $4T$  through a process for which pressure  $P = a T^{-1}$  where  $a$  is a constant. Then the work done by the gas is

Options :

1. ✘  $nRT$
2. ✘  $4nRT$
3. ✘  $2nRT$
4. ✔  $6nRT$

Question Number : 72 Question Id : 7225445673 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When an ideal gas with pressure  $P$  and volume  $V$  is compressed isothermally to one fourth of its volume, the pressure is  $P_1$ . When the same gas is compressed polytropically according to the equation  $PV^{1.5} = \text{constant}$  to one fourth of its initial volume, the pressure is  $P_2$ . The ratio of  $P_2/P_1$  is

Options :

1. ✘  $\frac{1}{2}$

2. ✘  $\frac{1}{2^{1.5}}$

3. ✔ 2

4. ✘  $2^{1.5}$

Question Number : 73 Question Id : 7225445674 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A Carnot engine whose efficiency is 40%, receives heat at 500K. If the efficiency is to be 50%, the source temperature for the same exhaust temperature is

Options :

1. ✘ 900 K



2. ✓ 600 K

3. ✗ 700 K

4. ✗ 800 K

**Question Number : 74 Question Id : 7225445675 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Optical fibers carry very large information compared to copper cables because of their

**Options :**

1. ✗ Large thickness

2. ✓ Extremely wide bandwidth

3. ✗ Extremely less bandwidth

4. ✗ Light weight

**Question Number : 75 Question Id : 7225445676 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A superconductor is a perfect ..... material.

Options :

- 1. ✓ Diamagnetic
- 2. ✘ Dielectric
- 3. ✘ Insulating
- 4. ✘ Semiconducting

### Chemistry

Section Id :	722544114
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 76 Question Id : 7225445677 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 characteristic of Plank's theory radiation?

Options :

1. ✘ Energy is always associated with radiations
2. ✔ The absorption and emission of energy occur continuously and not in small packets of energy called quanta
3. ✘ The energy associated with a quantum of radiation is directly proportional to its frequency
4. ✘ The emission and absorption of energy takes place in small packets called quanta

**Question Number : 77 Question Id : 7225445678 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The atomic number of calcium is 20 and mass number is 40, it contains

**Options :**

1. ✔ 20 protons, 20 electrons and 20 neutrons
2. ✘ 20 protons, 20 electrons and 22 neutrons
3. ✘ 20 protons, 20 electrons and 40 neutrons
4. ✘ 40 protons, 20 electrons and 20 neutrons

Question Number : 78 Question Id : 7225445679 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which molecule among the following obeys the octet rule?

Options :

1. ✘ PF<sub>5</sub>

2. ✘ NO

3. ✘ ClO<sub>2</sub>

4. ✔ O<sub>2</sub>

Question Number : 79 Question Id : 7225445680 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which one among the following has higher ionic radius?

Options :

1. ✔ C<sup>4+</sup>

2. ✘ N<sup>3-</sup>

3. ✘ O<sup>2-</sup>

4. ✘  $\text{Na}^+$

**Question Number : 80 Question Id : 7225445681 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

0.2 equivalents of  $\text{H}_2\text{SO}_4$  is present in 100 mL of the solution. What is its normality?

**Options :**

1. ✘ 1 N

2. ✔ 2 N

3. ✘ 4 N

4. ✘ 20 N

**Question Number : 81 Question Id : 7225445682 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which ion is isoelectronic with CO?

**Options :**

1. ✔  $\text{CN}^-$

2. ✘  $\text{O}_2^+$

3. ✘  $O_2^-$

4. ✘  $N_2^+$

**Question Number : 82 Question Id : 7225445683 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

20 mL of 0.01 M HCl solution is diluted to 100 mL What is the molarity of final solution?

**Options :**

1. ✘ 0.02 M

2. ✔ 0.002 M

3. ✘ 0.05 M

4. ✘ 0.001 M

**Question Number : 83 Question Id : 7225445684 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How many moles of HCl are required to react with completely with 2 moles of  $Na_2CO_3$ ?

**Options :**

1. ✘ 1
2. ✘ 2
3. ✘ 3
4. ✔ 4

**Question Number : 84 Question Id : 7225445685 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is a Lewis acid and also Bronsted acid?

**Options :**

1. ✘  $\text{CO}_2$
2. ✘  $\text{AlCl}_3$
3. ✔  $\text{H}^+$
4. ✘  $\text{Cu}^{2+}$

**Question Number : 85 Question Id : 7225445686 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the pH of 0.01 M NaOH solution?

Options :

1. ✘ 2
2. ✘ 8
3. ✘ 10
4. ✔ 12

Question Number : 86 Question Id : 7225445687 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Four alkali metals A, B, C and D are having standard electrode potentials as -3.05, -1.66, -0.40 and 0.80 V respectively. Which one will be most reducing?

Options :

1. ✔ A
2. ✘ B
3. ✘ C
4. ✘ D



**Question Number : 87 Question Id : 7225445688 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is used as depolarizer in dry cell battery?

**Options :**

1. ✘ Ammonium chloride
2. ✘ Potassium hydroxide
3. ✔ Manganese dioxide
4. ✘ Sodium phosphate

**Question Number : 88 Question Id : 7225445689 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

How much copper is deposited when 2 Faraday of electricity is passed through a  $\text{CuSO}_4$  solution? (Cu atomic weight = 63.54)

**Options :**

1. ✘ 31.77 g
2. ✘ 159.54 g

127.77 g

3. ✘

4. ✔ 63.54 g

**Question Number : 89 Question Id : 7225445690 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the cell potential for the following cell at 298 K?

$\text{Mg(s)} \mid \text{Mg}^{2+} (0.001\text{M}) \parallel \text{Cu}^{2+} (0.0001\text{M}) \mid \text{Cu(s)}$

Given  $E_0$  of  $\text{Cu}^{2+} \mid \text{Cu} = 0.34 \text{ V}$  and  $E_0$  of  $\text{Mg}^{2+} \mid \text{Mg} = -2.37 \text{ V}$

**Options :**

1. ✘ 1.34 V

2. ✔ 2.68 V

3. ✘ 0.268 V

4. ✘ 0.134 V

**Question Number : 90 Question Id : 7225445691 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The hard water sample contains the following ions/salts. Which water sample is more in hardness?

**Options :**

1. ✘ 100 grams of  $\text{CaCO}_3$  per litre
2. ✘ 50 equivalents of  $\text{Ca}^{2+}$  ions per litre
3. ✔ 20 moles of  $\text{CaCO}_3$  per litre
4. ✘ 20 moles of  $\text{MgCO}_3$  per litre

**Question Number : 91 Question Id : 7225445692 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

20 ml of hard water required 10 ml of EDTA solution. The hardness of water sample is 1000 ppm. What is the molarity of EDTA?

**Options :**

1. ✔ 0.02 M
2. ✘ 0.03 M
3. ✘ 0.005 M
4. ✘ 0.05 M

Question Number : 92 Question Id : 7225445693 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The hardness of water sample is 500 ppm. What is the weight of  $\text{MgSO}_4$  present in it, assume that the hardness is only due to the presence of magnesium sulphate.

Options :

1. ✘ 0.3 g
2. ✘ 1.2 g
3. ✔ 0.6 g
4. ✘ 0.01 g

Question Number : 93 Question Id : 7225445694 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 corrosion is high if

Options :

1. ✔ Anodic areas are small and cathodic areas are large
2. ✘ Anodic areas are large and cathodic areas are small
3. ✘ Both anodic and cathodic areas are large

4. ✘ Does not depend upon the area of anode and cathode

**Question Number : 94 Question Id : 7225445695 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In electroplating, the metal to be coated or electroplated is made of

Options :

1. ✘ Anode

2. ✔ Cathode

3. ✘ Both anode and cathode

4. ✘ Inert metal

**Question Number : 95 Question Id : 7225445696 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 thermosetting plastic?

Options :

1. ✘ Bakelite

2. ✘ Melamine

3. ✘ Epoxy resins

4. ✔ Teflon

**Question Number : 96 Question Id : 7225445697 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 following molecule contains the functionality TWO?

**Options :**

1. ✘ 1, 2-Dihydroxy benzene

2. ✘ Benzene

3. ✘ Phenol

4. ✔ Ethylene

**Question Number : 97 Question Id : 7225445698 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 synthetic rubber?

**Options :**

1. ✘ Buna-S

- 2. ✘ Buna-N
- 3. ✘ Neoprene
- 1. 4-Polyisoprene
- 4. ✔

**Question Number : 98 Question Id : 7225445699 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 renewable source of energy?

**Options :**

- 1. ✘ Solar energy
- 2. ✘ Wind Energy
- 3. ✔ Petrol
- 4. ✘ Hydro energy

**Question Number : 99 Question Id : 7225445700 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one among the following is not a greenhouse gas?

**Options :**

1. ✘ CH<sub>4</sub>
2. ✘ Water vapour
3. ✘ Chlorofluoro carbons
4. ✔ SO<sub>2</sub>

**Question Number : 100 Question Id : 7225445701 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one is responsible for the depletion of ozone layer?

**Options :**

1. ✘ Carbon free radical
2. ✘ Oxygen free radical
3. ✔ Chlorine free radical
4. ✘ Fluorine free radical



## Mechanical Engineering

Section Id :	722544115
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 101 Question Id : 7225445702 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the Taylor's tool life equation  $VT^n = C$ , value of index  $n$  depends on

Options :

1. ✓ Cutting tool material
2. ✘ Work piece material
3. ✘ Temperature at work tool interface
4. ✘ Working conditions

Question Number : 102 Question Id : 7225445703 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Burnishing is an operation of

Options :

1. ✘ Heat treatment
2. ✘ Deep boring
3. ✘ Hot working process
4. ✔ Gear surface finishing

Question Number : 103 Question Id : 7225445704 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Cutting force and power involved in a machine tool can be measured using a

Options :

1. ✘ Transducer
2. ✔ Dynamometer
3. ✘ Gyroscope

4. ✘ Pyrometer

**Question Number : 104 Question Id : 7225445705 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 'Sine bar' is an instrument used to measure

**Options :**

1. ✔ External tapers
2. ✘ Internal tapers
3. ✘ Any taper angles
4. ✘ Linear dimensions

**Question Number : 105 Question Id : 7225445706 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The main principle of electroplating is

**Options :**

1. ✔ Hydrolysis

2. ✘ Neutralization

3. ✘ Esterification

4. ✘ Saturation

**Question Number : 106 Question Id : 7225445707 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two slip gauges in conjunction can be used for measurement by

**Options :**

1. ✘ Adhesion

2. ✘ Staking

3. ✔ Wringing

4. ✘ Slipping

**Question Number : 107 Question Id : 7225445708 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Several machine tools can be controlled by a central computer in

Options :

1. ✘ NC machines
2. ✘ CNC machines
3. ✔ DNC machines
4. ✘ CCNC machines

Question Number : 108 Question Id : 7225445709 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

NC contouring is an example of

Options :

1. ✔ Continuous path positioning
2. ✘ Point-to-point positioning
3. ✘ Absolute positioning

## Incremental positioning

4. ✘

**Question Number : 109 Question Id : 7225445710 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a CNC program block, N002 GO2 G91 X40 Z40....., GO2 and G91 refer to

**Options :**

1. ✘ Circular interpolation in counter clockwise direction and incremental dimension
2. ✘ Circular interpolation in counter clockwise direction and absolute dimension
3. ✔ Circular interpolation in clockwise direction and incremental dimension
4. ✘ Circular interpolation in clockwise direction and absolute dimension

**Question Number : 110 Question Id : 7225445711 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

\_\_\_\_\_ of the following is not the main element of Flexible Manufacturing System.

**Options :**

1. ✘ Tool handling system
2. ✘ Material handling system

3. ✘ Main frame computer
4. ✔ Work handling system

**Question Number : 111 Question Id : 7225445712 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 sheet metal operation?

**Options :**

1. ✘ Punching
2. ✘ Piercing
3. ✔ Burring
4. ✘ Blanking

**Question Number : 112 Question Id : 7225445713 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Strongest form of an angle joint used in cabinet work is

**Options :**

1. ✘ Butt joint
2. ✘ Bridle joint
3. ✔ Dovetail joint
4. ✘ Lap joint

**Question Number : 113 Question Id : 7225445714 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Lapping is an operation of

**Options :**

1. ✘ Making a cone-shaped enlargement of the end of a hole
2. ✘ Smoothing and squaring the surface around a hole
3. ✔ Sizing and finishing a small diameter hole
4. ✘ Producing a hole by removing metal along the circumference of a hollow cutting tool



**Question Number : 114 Question Id : 7225445715 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In arc welding, the main criterion for the selection of electrode diameter is

**Options :**

1. ✘ Materials type to be welded
2. ✔ Thickness of material to be welded
3. ✘ Voltage
4. ✘ Process type

**Question Number : 115 Question Id : 7225445716 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In submerged arc welding, the arc is struck between

**Options :**

1. ✘ Consumable coated electrode and work piece
2. ✘ Non-consumable electrode and work piece

- 3. ✘ Tungsten electrode and work piece
- 4. ✔ Consumable bare electrode and work piece

**Question Number : 116 Question Id : 7225445717 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

‘Weld decay’ is a phenomenon associated with

**Options :**

- 1. ✘ Non-ferrous material
- 2. ✔ Stainless steel
- 3. ✘ Cast iron
- 4. ✘ Mild steel

**Question Number : 117 Question Id : 7225445718 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The surface roughness on a drawing is represented by a

**Options :**

1. ✘ Circle
2. ✔ Triangle
3. ✘ Square
4. ✘ Zig-zag lines

**Question Number : 118 Question Id : 7225445719 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The term 'Allowance' used in Limits and Fits refers to

**Options :**

1. ✔ Minimum clearance between shaft and hole
2. ✘ Maximum clearance between shaft and hole
3. ✘ Difference between maximum and minimum sizes of hole
4. ✘ Difference between maximum and minimum sizes of shaft

**Question Number : 119 Question Id : 7225445720 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The purpose of 'cores' used in casting process is to

**Options :**

1. ✘ Withdraw the pattern easily
2. ✘ Control the flow of molten metal
3. ✔ Make desired hollow shape in the casting
4. ✘ Support loose pieces

**Question Number : 120 Question Id : 7225445721 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Wax patterns are used in

**Options :**

1. ✔ Investment casting
2. ✘ Shell moulding
3. ✘ Slush casting

4. ✘ Centrifugal casting

Question Number : 121 Question Id : 7225445722 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Hot tear refers to a

Options :

1. ✘ Heat treatment process

2. ✘ Hot working process

3. ✘ Casting process

4. ✔ Casting defect

Question Number : 122 Question Id : 7225445723 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In Interference fit, interference exists between the

Options :

1. ✘ Low limit of shaft and low limit of hole

2. ✘ High limit of shaft and low limit of hole

3. ✔ Low limit of shaft and high limit of hole

4. ✘ High limit of shaft and high limit of hole

**Question Number : 123 Question Id : 7225445724 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In 'isometric projection', the lengths of all the lines parallel to the three planes should be set at

**Options :**

1. ✔ 0.816 times the true length

2. ✘ Same as the true length

3. ✘ 1.11 times the true length

4. ✘ 0.75 times the true length

**Question Number : 124 Question Id : 7225445725 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The operation of removing the burr or flash from the forged parts in drop forging is known as \_\_\_\_\_

Options :

1. ✘ Lancing

2. ✔ Trimming

3. ✘ Coining

4. ✘ Burring

Question Number : 125 Question Id : 7225445726 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Coining is the operation of \_\_\_\_\_

Options :

1. ✔ Cold forging

2. ✘ Hot forging

3. ✘ Cold extrusion

## Hot extrusion

4. ✘

**Question Number : 126 Question Id : 7225445727 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The material property that is most undesirable for forging is

Options :

1. ✘ Malleability

2. ✘ Ductility

3. ✔ Brittleness

4. ✘ Plasticity

**Question Number : 127 Question Id : 7225445728 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The cold chisels are made by

Options :

1. ✘ Rolling



2. ✘ Piercing

3. ✘ Drawing

3. ✘

4. ✔ Forging

4. ✔

**Question Number : 128 Question Id : 7225445729 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

'Monel metal' is an alloy of Copper and

**Options :**

1. ✘ Zinc

2. ✘ Aluminum

2. ✘

3. ✔ Nickel

3. ✔

4. ✘ Lead

4. ✘

**Question Number : 129 Question Id : 7225445730 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Railway tracks (rails) are usually made of

Options :

1. ✘ Mild steel
2. ✘ Alloy steel
3. ✘ Tungsten steel
4. ✔ High carbon steels

Question Number : 130 Question Id : 7225445731 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the percentage of Carbon in Steels?

Options :

1. ✘ More than 2.5 %
2. ✔ Upto 2%
3. ✘ More than 3%
4. ✘ More than 4%

**Question Number : 131 Question Id : 7225445732 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

After cold working, which of the following processes is used to relieve stresses?

**Options :**

1. ✘ Normalizing
2. ✔ Annealing
3. ✘ Austempering
4. ✘ Martempering

**Question Number : 132 Question Id : 7225445733 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Addition of Manganese to a steel increases its

**Options :**

1. ✘ Hardness
2. ✘ Fluidity

3. ✓ Tensile strength

4. ✘ Ductility

**Question Number : 133 Question Id : 7225445734 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

‘Connecting rods’ in automobiles are usually made of

**Options :**

1. ✘ Low carbon steel

2. ✘ Mild steel

3. ✓ Medium carbon steel

4. ✘ High carbon steel

**Question Number : 134 Question Id : 7225445735 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The resultant of two forces P and Q acting along the same straight line and in same direction is

**Options :**

1. ✘  $2P + Q$

2. ✘  $P + 2Q$

3. ✔  $P + Q$

4. ✘  $P - Q$

Question Number : 135 Question Id : 7225445736 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In a simply supported beam having length,  $L$ , and subjected to a concentrated load,  $W$ , at mid-point, the magnitude and position respectively of maximum bending moment are

Options :

1. ✔  $WL / 4$ , at the mid-point

2. ✘  $WL / 4$ , at the end

3. ✘  $WL / 8$ , at the mid-point

4. ✘  $WL / 8$ , at the end

**Question Number : 136 Question Id : 7225445737 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What will be the strain energy stored in the metallic bar of cross sectional area  $2 \text{ cm}^2$  and gauge length 10 cm, if it is stretched by 0.002 cm under the load of 12 kN?

**Options :**

1. ✘ 10 N-cm
2. ✔ 12 N-cm
3. ✘ 14 N-cm
4. ✘ 16 N-cm

**Question Number : 137 Question Id : 7225445738 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a simply supported beam, what would be the change in deflection at the center of the beam, if the point load at the center is replaced by a uniformly distributed load throughout the length?

**Options :**

1. ✘ 1/2 times
2. ✘ 1/4 times

3. ✘ 5/8 times

4. ✔ 3/8 times

**Question Number : 138 Question Id : 7225445739 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When a body is stressed within its elastic limit, the ratio of the linear strain to the lateral strain is known as

**Options :**

1. ✘ Poisson's ratio

2. ✔ 1/Poisson's ratio

3. ✘ Stress ratio

4. ✘ Strain ratio

**Question Number : 139 Question Id : 7225445740 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The efficiency of a machine

**Options :**

Is directly proportional to the velocity ratio

1. ✘

Should occur when the load is 50% of maximum permissible load

2. ✘

Is the ratio of mechanical advantage to the velocity ratio

3. ✔

Is the ratio of velocity ratio to the mechanical advantage

4. ✘

**Question Number : 140 Question Id : 7225445741 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a solid circular steel shaft of 2 cm diameter is subjected to a permissible shear stress of 10 kN/cm<sup>2</sup>, then the value of twisting moment will be

**Options :**

5π kN-cm

1. ✔

10π kN-cm

2. ✘

15π kN-cm

3. ✘



4. ✘  $20\pi$  kN-cm

**Question Number : 141 Question Id : 7225445742 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A key of 14 mm width, 9 mm height and 100 mm length is mounted on a shaft of 50 mm diameter. If allowable shear stress for the key material is 50 MPa, what is the maximum torque that can be transmitted?

**Options :**

1. ✘ 3500 Nm

2. ✘ 4500 Nm

3. ✘ 2250 Nm

4. ✔ 1750 Nm

**Question Number : 142 Question Id : 7225445743 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 couplings is not used to connect two shafts that have both lateral and angular misalignments?

**Options :**

1. ✘ Universal coupling
2. ✔ Flange coupling
3. ✘ Oldham coupling
4. ✘ Bushed pin type coupling

**Question Number : 143 Question Id : 7225445744 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two closely coiled helical springs A & B are such that the mean diameter of spring A is half that of spring B, possess an equal number of active coils and same wire diameter. If they are subjected to the same axial load of  $W$ , the ratio of deflection in spring A to that in spring B is

\_\_\_\_\_

**Options :**

1. ✔  $1/8$
2. ✘  $1/4$
3. ✘  $2$

4. ✘ 8

**Question Number : 144 Question Id : 7225445745 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a flywheel having a mass of 100 kg and radius of gyration of 10 cm, is rotating at a speed of 10 rad/sec, its rotational kinetic energy will be equal to

**Options :**

1. ✘ 5J

2. ✘ 10J

3. ✔ 50J

4. ✘ 100J

**Question Number : 145 Question Id : 7225445746 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a Watt governor, 10 cm height corresponds to a speed of about

**Options :**

1. ✘ 85 rpm

2. ✓ 95 rpm

3. ✘ 87 rpm

4. ✘ 102 rpm

**Question Number : 146 Question Id : 7225445747 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Creep in a belt is due to

**Options :**

1. ✘ Material effect of the belt

2. ✘ Material effect of the pulley

3. ✘ Surrounding conditions

4. ✓ Uneven extensions and contractions due to varying tension

**Question Number : 147 Question Id : 7225445748 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 following is a positive drive?

Options :

1. ✓ Chain drive
2. ✘ Crossed flat belt drive
3. ✘ Rope drive
4. ✘ V-belt drive

Question Number : 148 Question Id : 7225445749 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When the axes of the first and last gears are co-axial, then the train is known as

Options :

1. ✘ Simple gear train
2. ✘ Compound gear train
3. ✓ Reverted gear train

4. ✘ Epicyclical gear train

Question Number : 149 Question Id : 7225445750 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Silent chain is made up of

Options :

1. ✘ Links and blocks

2. ✘ Links, pins, bushes and rollers

3. ✘ Pins, bushes and rollers

4. ✔ Inverted tooth overlapping links

Question Number : 150 Question Id : 7225445751 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The effective diameter of a cylinder is 400 mm and highest pressure of steam acting on engine cylinder head is  $1.1 \text{ N/mm}^2$ . If the allowable stress in tension of bolt material is  $32 \text{ N/mm}^2$  and number of bolts is 11, the core diameter of the bolt required is \_\_\_\_\_.

Options :

1. ✘ 11mm

2. ✔ 22mm

3. ✘ 33mm

4. ✘ 12mm

**Question Number : 151 Question Id : 7225445752 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 an extensive property?

**Options :**

1. ✘ Pressure

2. ✔ Volume

3. ✘ Temperature

4. ✘ Density

**Question Number : 152 Question Id : 7225445753 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 laws states that “the heat and work are mutually convertible?”

**Options :**

1. ✘ Boyle
2. ✘ Charles
3. ✔ Joule
4. ✘ Avogadro

**Question Number : 153 Question Id : 7225445754 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The second law of thermodynamics defines

**Options :**

1. ✘ Heat
2. ✘ Work



3. ✘ Energy

4. ✔ Entropy

**Question Number : 154 Question Id : 7225445755 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A gas expands from  $0.025 \text{ m}^3$  to  $0.075 \text{ m}^3$  at a constant pressure of  $2.0 \text{ MPa}$  and absorbs  $150 \text{ kJ}$  of heat during the process. The change in internal energy of the gas in  $\text{kJ}$  is

**Options :**

1. ✘ 149.90

2. ✔ 50

3. ✘ 100

4. ✘ 150

**Question Number : 155 Question Id : 7225445756 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The efficiency of a Carnot cycle may be increased by

**Options :**

1. ✓ Increasing the source temperature
2. ✘ Decreasing the source temperature
3. ✘ Increasing the sink temperature
4. ✘ Increasing both the source and sink temperatures

**Question Number : 156 Question Id : 7225445757 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For the same compression ratio, the efficiency of a dual cycle is

**Options :**

1. ✓ More than Diesel cycle and less than Otto cycle
2. ✘ Less than Diesel cycle and more than Otto cycle
3. ✘ Less than Diesel cycle

4. ✘ More than Otto cycle

Question Number : 157 Question Id : 7225445758 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The principal constituents of a fuel are

Options :

1. ✔ Carbon and Hydrogen

2. ✘ Oxygen and Hydrogen

3. ✘ Sulphur and Oxygen

4. ✘ Sulphur and Hydrogen

Question Number : 158 Question Id : 7225445759 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A single cylinder engine running at 1800 rpm develops a torque of 10 Nm. The indicated power of the engine is 2.0 kW. The loss due to friction is \_\_\_\_\_ W.

Options :

1. ✘ 1.884

2. ✘ 106

3. ✔ 116

4. ✘ 18.84

**Question Number : 159 Question Id : 7225445760 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If N is the rpm, number of power strokes per hour in a two stroke engine is \_\_\_\_\_

**Options :**

1. ✘  $N/2$

2. ✘ N

3. ✘ 2N

4. ✔ 60N

**Question Number : 160 Question Id : 7225445761 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 an ideal cycle for a gas turbine power plant?

**Options :**

1. ✓ Brayton cycle
2. ✗ Otto cycle
3. ✗ Sterling cycle
4. ✗ Diesel cycle

**Question Number : 161 Question Id : 7225445762 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The capacity of a compressor is expressed in

**Options :**

1. ✗  $\text{kg/m}^3$
2. ✗  $\text{m}^3/\text{kg}$

3. ✓  $\text{m}^3/\text{min}$

4. ✗  $\text{kg}/\text{m}^2$

**Question Number : 162 Question Id : 7225445763 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The normal range of compression ratio for a Diesel cycle is

**Options :**

1. ✗ 4 to 6

2. ✗ 6 to 8

3. ✓ 15 to 20

4. ✗ Above 25

**Question Number : 163 Question Id : 7225445764 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is a high pressure boiler?

**Options :**

1. ✘ Cochran boiler
2. ✘ Babcock and Wilcox boiler
3. ✔ Benson boiler
4. ✘ Lancashire boiler

**Question Number : 164 Question Id : 7225445765 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 used to put off fire in the furnace of a boiler when the level of water in the boiler falls to an unsafe limit?

Options :

1. ✘ Blow off cock
2. ✔ Fusible plug
3. ✘ Stop valve

## Safety valve

4. ✘

**Question Number : 165 Question Id : 7225445766 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Dryness fraction of a dry saturated steam is \_\_\_\_\_

**Options :**

1. ✔ 1

2. ✘ 0

3. ✘ 0.5

4. ✘ 0.75

**Question Number : 166 Question Id : 7225445767 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the isentropic enthalpy drop in a moving blade is 50% of that in a fixed blade, the degree of reaction is

**Options :**

1. ✘ 0.25



2. ✓ 0.33

3. ✘ 0.5

4. ✘ 0.75

**Question Number : 167 Question Id : 7225445768 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The enthalpy of a fluid changes by 4.55 kJ/kg when it is made to flow through a nozzle. What will be the final velocity of the fluid, if it enters the nozzle at 30 m/s?

**Options :**

1. ✘ 30.15 m/s

2. ✘ 9.10 m/s

3. ✘ 60.30 m/s

4. ✓ 100 m/s

**Question Number : 168 Question Id : 7225445769 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 the work done on the blades to the energy supplied to the blades is called

Options :

1. ✓ Blading efficiency
2. ✘ Nozzle efficiency
3. ✘ Stage efficiency
4. ✘ Mechanical efficiency

Question Number : 169 Question Id : 7225445770 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The friction in a nozzle \_\_\_\_\_ exit velocity of steam.

Options :

1. ✘ Has no effect on
2. ✓ Decreases
3. ✘ Increases

4. ✘ Decreases up to a certain point and then increases

**Question Number : 170 Question Id : 7225445771 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Reheating is used to \_\_\_\_\_

**Options :**

1. ✘ Increase the compressor work

2. ✔ Increase the turbine work

3. ✘ Decrease the compressor work

4. ✘ Decrease the turbine work

**Question Number : 171 Question Id : 7225445772 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The specific gravity of an oil, whose specific weight is  $2.4525 \text{ kN/m}^3$ , is

**Options :**

1. ✘ 0.05

2. ✔ 0.25

3. ✘ 0.50

4. ✘ 0.75

**Question Number : 172 Question Id : 7225445773 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 the normal force of jet of water on a plate inclined at an angle of  $30^\circ$  to that when the plate is normal to jet is \_\_\_\_

**Options :**

1. ✘  $\sqrt{2}$

2. ✘  $1/\sqrt{2}$

3. ✘ 1

4. ✓ 1/2

**Question Number : 173 Question Id : 7225445774 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The loss of head due to friction in a circular pipe is \_\_\_\_\_

**Options :**

1. ✗  $flv^2 / gd$

2. ✓  $4 flv^2 / 2gd$

3. ✗  $flv^2 / 3gd$

4. ✗  $flv^2 / 4gd$

**Question Number : 174 Question Id : 7225445775 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The unit power developed by a turbine is \_\_\_\_\_, if Power developed by the turbine under a head of water H is P.

**Options :**

1. ✗  $PH^{-0.5}$

2. ✘  $\text{PH}^{-1.0}$

3. ✔  $\text{PH}^{-1.5}$

4. ✘  $\text{PH}^{-2.0}$

**Question Number : 175 Question Id : 7225445776 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The surface tension in a soap bubble of 40 mm diameter, when the inside pressure is 2.5 Pa above the atmospheric pressure, is \_\_\_\_\_ N/m

**Options :**

1. ✘ 0.025

2. ✘ 0.005

3. ✘ 0.05

4. ✔ 0.0125

**Question Number : 176 Question Id : 7225445777 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

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

The bulk modulus of elasticity of liquid whose pressure is increased from 70 kPa to 130 kPa and volume decreased by 0.15% is \_\_\_\_\_.

**Options :**

- 1. ✘ 40 Pa
- 2. ✘ 40 kPa
- 3. ✔ 40 MPa
- 4. ✘ 40 GPa

**Question Number : 177 Question Id : 7225445778 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When a liquid is flowing through a pipe, the velocity of the liquid is maximum \_\_\_\_\_

**Options :**

- 1. ✘ Near the walls
- 2. ✘ At a point at  $1/4^{\text{th}}$  of the radius from the center

- 3. ✘ At a point at  $3/4^{\text{th}}$  of the radius from the center
- 4. ✔ At the center

**Question Number : 178 Question Id : 7225445779 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A centrifugal pump will start delivering liquid only when the pressure rise in the impeller is equal to the

**Options :**

- 1. ✘ Kinetic head
- 2. ✘ Velocity head
- 3. ✔ Manometric head
- 4. ✘ Static head

**Question Number : 179 Question Id : 7225445780 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



Slip of a reciprocating pump is defined as \_\_\_\_\_ of theoretical discharge and actual discharge.

Options :

1. ✘ Ratio
2. ✘ Product
3. ✘ Sum
4. ✔ Difference

Question Number : 180 Question Id : 7225445781 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A reversible engine has ideal thermal efficiency of 33.33%. When it is used as a refrigerating machine with all other conditions unchanged, the COP will be \_\_\_\_\_

Options :

1. ✘ 1.33
2. ✔ 2.0
3. ✘ 2.33

4. ✘ 3.33

**Question Number : 181 Question Id : 7225445782 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a vapour compression system, the condition of refrigerant is dry saturated vapour

Options :

- 1. ✓ Before entering the compressor
- 2. ✘ After leaving the compressor
- 3. ✘ Before entering the condenser
- 4. ✘ After leaving the condenser

**Question Number : 182 Question Id : 7225445783 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

During a refrigeration cycle, heat is absorbed by the refrigerant in

Options :

- 1. ✘ Condenser

2. ✘ Expansion valve

3. ✘ Compressor

4. ✔ Evaporator

**Question Number : 183 Question Id : 7225445784 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

One tonne of refrigeration (1TR) means that the heat removing capacity is

**Options :**

1. ✘ 21 kJ/min

2. ✔ 210 kJ/min

3. ✘ 420 kJ/min

4. ✘ 620 kJ/min

**Question Number : 184 Question Id : 7225445785 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Work study is primarily concerned with

Options :

1. ✓ Improving present method and finding standard time
2. ✗ Worker motivation
3. ✗ Improving quality
4. ✗ Improving production capacity

Question Number : 185 Question Id : 7225445786 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Gantt charts are used in

Options :

1. ✗ Breakeven analysis
2. ✓ Production scheduling
3. ✗ Quality control

Sales forecasting

4. ✘

**Question Number : 186 Question Id : 7225445787 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

'Works cost' implies

Options :

Prime cost

1. ✘

Factory expenses

2. ✘

Prime cost + factory expenses

3. ✔

Prime cost + office expenses

4. ✘

**Question Number : 187 Question Id : 7225445788 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

'Salary of sales manager' comes under

Options :

1. ✘ Prime cost
2. ✘ Production cost
3. ✘ Administrative overheads
4. ✔ Selling and distribution overheads

**Question Number : 188 Question Id : 7225445789 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In ABC analysis, classification of inventory items is based on

**Options :**

1. ✔ Annual consumption value
2. ✘ Unit cost of the item
3. ✘ Consumption quantity
4. ✘ Criticality of items to production

**Question Number : 189 Question Id : 7225445790 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Capital expenditure means

**Options :**

1. ✘ Expenses incurred in acquiring capital
2. ✔ Expenditure on procurement of fixed assets
3. ✘ Expenditure on procurement of current assets
4. ✘ Recurring expenses

**Question Number : 190 Question Id : 7225445791 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which probability distribution is used to construct the C-Chart?

**Options :**

1. ✘ Binomial
2. ✔ Poisson

3. ✘ Normal

4. ✘ Exponential

**Question Number : 191 Question Id : 7225445792 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Acceptance sampling is widely used in

Options :

1. ✘ Batch production

2. ✘ Job production

3. ✔ Mass production

4. ✘ Intermittent production

**Question Number : 192 Question Id : 7225445793 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

ISO 9000 determines \_\_\_\_\_

Options :



1. ✘ The procedure used for quality control
2. ✘ Infrequent causes of variation
3. ✘ Performance of suppliers regarding quality
4. ✔ If the company practices its written procedures

**Question Number : 193 Question Id : 7225445794 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 generally not a basic characteristic of an entrepreneur?

**Options :**

1. ✘ Risk taking nature
2. ✘ Innovative thinking
3. ✘ Expectation of profits
4. ✔ Inventiveness

**Question Number : 194 Question Id : 7225445795 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The longitudinal distance between the centres of the front and the rear axles is called

**Options :**

1. ✘ Wheel track
2. ✔ Wheel base
3. ✘ Wheel length
4. ✘ Wheel clearance

**Question Number : 195 Question Id : 7225445796 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 components is used to provide different rotational speed to the road wheels when the vehicle negotiates curved paths?

**Options :**

1. ✔ Differential
2. ✘ Rear axle

3. ✘ Steering wheel

4. ✘ Front axle

**Question Number : 196 Question Id : 7225445797 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When the brakes of a moving vehicle are applied, \_\_\_\_\_ energy is converted into \_\_\_\_\_ energy.

**Options :**

1. ✘ Heat to kinetic

2. ✘ Potential to kinetic

3. ✘ Potential to heat

4. ✔ Kinetic to heat

**Question Number : 197 Question Id : 7225445798 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The clutch is located between the transmission and the \_\_\_\_\_

**Options :**

1. ✓ Engine
2. ✗ Rear axle
3. ✗ Propeller shaft
4. ✗ Differential

**Question Number : 198 Question Id : 7225445799 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The materials used for cylinder block are

**Options :**

1. ✗ Cast iron and steel
2. ✓ Cast iron and aluminium alloy
3. ✗ Steel and aluminium alloy
4. ✗ Brass and steel

**Question Number : 199 Question Id : 7225445800 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 a governor in automobiles is to

**Options :**

1. ✓ Limit the vehicle speed
2. ✘ Increase vehicle safety
3. ✘ Increase fuel economy
4. ✘ Give stability to the vehicle

**Question Number : 200 Question Id : 7225445801 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When a gear box has four forward speeds and one reverse speed, it is said to be a

**Options :**

1. ✘ 3-speed gear box

2. ✓ 4-speed gear box

3. ✘ 5-speed gear box

4. ✘ 6-speed gear box