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.

Question Paper Name :	Mechanical Engineering 19th Sep 2021 Shift2
Duration :	180
Total Marks :	200
Display Marks:	No
Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? (SA type of questions will be always auto saved) :	Yes
Is this Group for Examiner? :	No

Mathematics

Section Id :	477203413
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

Question Number : 1 Question Id : 47720321033 Display Question Number : Yes Is Question Mandatory : No

If $k \neq -5$ is a real number, then, the number of solutions to the following system of equations

$$3x - y + 4z = 3$$
$$x + 2y - 3z = -2$$
$$6x + 5y + kz = -3$$ is

Options :

1. ✖ *0*

2. ✔ *1*

3. ✖ *2*

4. ✖ *infinitely many*

Question Number : 2 Question Id : 47720321034 Display Question Number : Yes Is Question Mandatory : No

$$\begin{vmatrix} 1 & 1+p & 1+p+q \\ 2 & 3+2p & 4+3p+2q \\ 3 & 6+3p & 10+6p+3q \end{vmatrix} =$$

Options :

1. ✖ 0

2. ✔ 1

3. ✖ 2

4. ✖ 3

Question Number : 3 Question Id : 47720321035 Display Question Number : Yes Is Question Mandatory : No

Let $|A|$ denote the determinant of the matrix A. If A is a square matrix of order 3, and $|4A| = r|A|$, then the value of r is

Options :

1. ✖ 0

2. ✖ 4

3. ✖ 16

4. ✔ 64

Question Number : 4 Question Id : 47720321036 Display Question Number : Yes Is Question Mandatory : No

If $\begin{vmatrix} y & y \\ 1 & y \end{vmatrix} = \begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$, then the value of y is

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ 3

Question Number : 5 Question Id : 47720321037 Display Question Number : Yes Is Question Mandatory : No

Let $\begin{vmatrix} 2 & 3+i & -1 \\ 3-i & 0 & -1+i \\ -1 & -1-i & 1 \end{vmatrix} = a + ib$, where a and b are real numbers. Then the value of b is

Options :

1. ✔ 0

2. ✖ 1

3. ✖ 3

4. ✖ 4

Question Number : 6 Question Id : 47720321038 Display Question Number : Yes Is Question Mandatory : No

If $\frac{y^2-5y+1}{(y+1)(y+2)(y+3)} = \frac{a}{y+1} + \frac{b}{(y+1)(y+2)} + \frac{c}{(y+1)(y+2)(y+3)}$, *then*,

Options :

1. ✖ $a = 1, b = 10, c = 25$

2. ✔ $a = 1, b = -10, c = 25$

3. ✖ $a = 5, b = 10, c = 25$

4. ✖ $a = 5, b = -10, c = 25$

Question Number : 7 Question Id : 47720321039 Display Question Number : Yes Is Question Mandatory : No

$\frac{2x+3}{(x^2+1)(x+4)} =$

Options :

1. ✖ $\frac{5}{17(x+4)} + \frac{5x+14}{17(x^2+1)}$

2. ✖ $\frac{-5}{17(x+4)} - \frac{5x+14}{17(x^2+1)}$

3. ✔ $\frac{-5}{17(x+4)} + \frac{5x+14}{17(x^2+1)}$

4. ✖ $\frac{-5}{17(x+4)}+\frac{5x-14}{17(x^2+1)}$

Question Number : 8 Question Id : 47720321040 Display Question Number : Yes Is Question Mandatory : No

If x and y are two distinct real numbers, then, the number of values of θ in $[0,2\pi]$ for which $\operatorname{cosec}\theta=\frac{x^2-y^2}{x^2+y^2}$ is

Options :

1. ✔ 0

2. ✖ 1

3. ✖ 2

4. ✖ 3

Question Number : 9 Question Id : 47720321041 Display Question Number : Yes Is Question Mandatory : No

If $\cos(\alpha-\beta)+\cos(\beta-\gamma)+\cos(\gamma-\alpha)=-\frac{3}{2}$, then $\cos\alpha+\cos\beta+\cos\gamma=$

Options :

1. ✖ $-\frac{3}{2}$

2. ✖ -1

3. ✔ 0

4. ✖ 1

Question Number : 10 Question Id : 47720321042 Display Question Number : Yes Is Question Mandatory : No

For all real numbers θ, the value of $\sin^2\theta + \cos^4\theta$ is greater than or equal to

Options :

1. ✔ $\frac{3}{4}$

2. ✖ 1

3. ✖ $\frac{5}{4}$

4. ✖ 2

Question Number : 11 Question Id : 47720321043 Display Question Number : Yes Is Question Mandatory : No

Let x be a real number such that $\tan\left(\frac{\pi}{4}+x\right)+\tan\left(\frac{\pi}{4}-x\right)=2$. Then x is of the form $x=n\pi+a$, where $n\in\mathbb{Z}$, and $a=$

Options :

1. ✔ 0

2. ✖ $\frac{\pi}{3}$

3. ✖ $\frac{\pi}{4}$

4. ✖ $\frac{\pi}{6}$

Question Number : 12 Question Id : 47720321044 Display Question Number : Yes Is Question Mandatory : No

If $(sin^{-1}x) > (cos^{-1}x)$, then x belongs to the interval

Options :

1. ✖ $[0,\frac{1}{\sqrt{2}})$

2. ✔ $(\frac{1}{\sqrt{2}},1]$

3. ✖ $\left[\frac{1}{\sqrt{2}},1\right]$

4. ✖ $\left[0,\frac{1}{\sqrt{2}}\right]$

Question Number : 13 Question Id : 47720321045 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle ΔABC, with sides of length a,b and c, and angles A,B and C. If a,b,c and the area of the triangle ΔABC are all rational, then

Options :

1. ✖ $tan\frac{B}{2}$ *is rational and* $tan\frac{C}{2}$ *is irrational.*

2. ✖

$\tan\frac{B}{2}$ is irrational and $\tan\frac{C}{2}$ is rational.

3. ✔ $\tan\frac{B}{2}$ and $\tan\frac{C}{2}$ are both rational.

4. ✖ $\tan\frac{B}{2}$ and $\tan\frac{C}{2}$ are both irrational.

Question Number : 14 Question Id : 47720321046 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle ΔABC, with sides of length a,b and c, and angles A,B and C. If $3a=b+c$, then the value of $\cot\frac{B}{2}.\cot\frac{C}{2}$ is

Options :

1. ✖ 0

2. ✖ $\frac{1}{2}$

3. ✖ $\sqrt{3}$

4. ✔ 2

Question Number : 15 Question Id : 47720321047 Display Question Number : Yes Is Question Mandatory : No

$2\tan^{-1}\left(\frac{3}{4}\right)-\tan^{-1}\left(\frac{17}{31}\right)=$

Options :

1. ✖ 0

2. ✔ $\frac{\pi}{4}$

3. ✖ $\frac{\pi}{2}$

4. ✖ π

Question Number : 16 Question Id : 47720321048 Display Question Number : Yes Is Question Mandatory : No

Consider a triangle ΔABC with angles A,B and C. If $\cos A + \cos B + \cos C = \frac{3}{2}$, then the triangle ΔABC is

Options :

1. ✔ equilateral.

2. ✖ isosceles, and right-angled.

3. ✖ isosceles, with one of the angles equal to $\frac{\pi}{6}$.

4. ✖ scalene

Question Number : 17 Question Id : 47720321049 Display Question Number : Yes Is Question Mandatory : No

The value of $\cos^2 x + \cos^2\left(x + \frac{\pi}{3}\right) + \cos^2\left(x - \frac{\pi}{3}\right)$ is

Options :

1. ✖ 1

2. ✔ $\frac{3}{2}$

3. ✖ 2

4. ✖ $\frac{5}{2}$

Question Number : 18 Question Id : 47720321050 Display Question Number : Yes Is Question Mandatory : No

The value of $\left(\frac{\sqrt{3}+i}{\sqrt{3}-i}\right)^3$ is

Options :

1. ✖ $-2\sqrt{2}$

2. ✔ -1

3. ✖ 0

4. ✖ $2\sqrt{2}$

Question Number : 19 Question Id : 47720321051 Display Question Number : Yes Is Question Mandatory : No

If $x+iy=\frac{a+ib}{a-ib}$, then $x^2+y^2=$

Options :

1. ✖ 0

2. ✔ 1

3. ✖ 2

4. ✖ 4

Question Number : 20 Question Id : 47720321052 Display Question Number : Yes Is Question Mandatory : No

If a circle of radius 5 touches the circle $x^2 + y^2 - 2x - 4y = 20$ at the point *(5,5), then, its center is*

Options :

1. ✖ (8,8)

2. ✖ (8,9)

3. ✔ (9,8)

4. ✖ (9,9)

Question Number : 21 Question Id : 47720321053 Display Question Number : Yes Is Question Mandatory : No

The equation $9x^2 - 24xy + 16\,y^2 - 20x - 15y = 60$ represents

Options :

1. ✔ a parabola

2. ✖ an ellipse

3. ✖ a hyperbola

4. ✖ a circle

Question Number : 22 Question Id : 47720321054 Display Question Number : Yes Is Question Mandatory : No

Let (x_j,y_j), $j=1,2,3,4$, be points of intersection of the parabola $y^2 = 4ax$ and the circle $x^2 + y^2 + 2gx + 2fy + c = 0$.

Then $y_1 + y_2 + y_3 + y_4 =$

Options :

1. ✖ -2

2. ✖ $-\frac{1}{2}$

3. ✔ 0

4. ✖ $\frac{1}{2}$

Question Number : 23 Question Id : 47720321055 Display Question Number : Yes Is Question Mandatory : No

The length of the major axis of the ellipse $9x^2 + 5y^2 - 30y = 0$ is

Options :

1. ✖ $\sqrt{5}$

2. ✖ 3

3. ✖ $2\sqrt{5}$

4. ✔ 6

Question Number : 24 Question Id : 47720321056 Display Question Number : Yes Is Question Mandatory : No

If S *(-1, 1) is one of the foci of a hyperbola,* $x - y + 3 = 0$ is its directrix corresponding to S and 3 is its eccentricity, then, the equation of the hyperbola is

Options :

1. ✖ $7x^2 + 18xy + 7y^2 + 50x + 50y + 77 = 0$

2. ✖ $7x^2 + 18xy + 7y^2 + 50x - 50y + 77 = 0$

3. ✔ $7x^2 - 18xy + 7y^2 + 50x - 50y + 77 = 0$

4. ✖ $7x^2 - 18xy - 7y^2 - 50x + 50y + 77 = 0$

Question Number : 25 Question Id : 47720321057 Display Question Number : Yes Is Question Mandatory : No

The equation $4(x-2y+1)^2+9(2x+y+2)^2=25$ represents

Options :

1. ✖ a parabola

2. ✔ an ellipse

3. ✖ a hyperbola

4. ✖ a circle

Question Number : 26 Question Id : 47720321058 Display Question Number : Yes Is Question Mandatory : No

Let f be a twice differentiable function such that $f''(x)+f(x)=0$, and $f'(x)=g(x)$. If $h(x)=[f(x)]^2+[g(x)]^2$, and $h(10)=20$, then $h(40)$ =

Options :

1. ✔ 20

2. ✖ 40

3. ✖ 80

4. ✖ 160

Question Number : 27 Question Id : 47720321059 Display Question Number : Yes Is Question Mandatory : No

$\lim_{x \to \frac{\pi}{2}} \left(\frac{\cot x - \cos x}{\cos^2 x}\right) =$

Options :

1. ✖ -1

2. ✔ 0

3. ✖ $\sqrt{3}$

4. ✖ $\frac{\pi}{2}$

Question Number : 28 Question Id : 47720321060 Display Question Number : Yes Is Question Mandatory : No

Let $\mathbb{R}$ be the set of all real numbers. Let $f : \mathbb{R} \to \mathbb{R}$ satisfy the condition:

$|f(x) - f(y)| \leq |x-y|^{2021}$, for all $x, y \in \mathbb{R}$. Then the value of $f'(2022)$ is

Options :

1. ✔ 0

2. ✖ 1

3. ✖ 2021

4. ✖ 2022

Question Number : 29 Question Id : 47720321061 Display Question Number : Yes Is Question

Mandatory : No

The number of real roots of the equation $x + e^x = 0$ is

Options :

1. ✖ 0

2. ✔ 1

3. ✖ 2

4. ✖ Infinitely many

Question Number : 30 Question Id : 47720321062 Display Question Number : Yes Is Question Mandatory : No

If $y = \text{Tan}^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$, then $\frac{dy}{dx} =$

Options :

1. ✖ $\cot^2 x$

2. ✖ $\sec^2 x$

3. ✔ $-\frac{1}{2}$

4. ✖ $\frac{1}{2}$

Question Number : 31 Question Id : 47720321063 Display Question Number : Yes Is Question Mandatory : No

The equation of the tangent to the curve $x = \sin 3t$, $y = \cos 2t$, at $t = \frac{\pi}{4}$ is given by

Options :

1. ✖ $\sqrt{2}\,x - 3y - 2 = 0$

2. ✖ $\sqrt{2}\,x + 3y - 2 = 0$

3. ✔ $2\sqrt{2}\,x - 3y - 2 = 0$

4. ✖ $2\sqrt{2}\,x - 3y + 2 = 0$

Question Number : 32 Question Id : 47720321064 Display Question Number : Yes Is Question Mandatory : No

An open tank with a square base (with side x) and vertical sides (with height y) is to be constructed from a metal sheet so as to hold a given quantity of water. The cost of the material will be the least if

Options :

1. ✖ $x=y$

2. ✔ $x=2y$

3. ✖ $2x=y$

4. ✖

$4x=y$

Question Number : 33 Question Id : 47720321065 Display Question Number : Yes Is Question Mandatory : No

The function $f(x) = x^3 - 12x^2 + 36x + 48$, is decreasing in the interval

Options :

1. ✖ $(-\infty, 2)$

2. ✖ $(-\infty, 6)$

3. ✔ $(2,6)$

4. ✖ $(6, \infty)$

Question Number : 34 Question Id : 47720321066 Display Question Number : Yes Is Question Mandatory : No

A shopkeeper can buy x items for *Rs.* $\left(\frac{x}{5} + 500\right)$. He can sell the x items at the rate *Rs.* $\left(5 - \frac{x}{100}\right)$ per item. Then the number of items he should sell to make maximum profit is

Options :

1. ✔ 240

2. ✖ 360

3. ✖ 400

4. ✖ 500

Question Number : 35 Question Id : 47720321067 Display Question Number : Yes Is Question Mandatory : No

If $z = ax^2 + 2hxy + by^2$, then $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} =$

Options :

1. ✖ z

2. ✖ z^2

3. ✖ $\frac{1}{2}z$

4. ✔ $2z$

Question Number : 36 Question Id : 47720321068 Display Question Number : Yes Is Question Mandatory : No

$\int_{-1}^{1} \frac{x \sin^{-1} x}{\sqrt{1-x^2}}\, dx =$

Options :

1. ✖ 0

2. ✖ 1

3. ✖ $\frac{3}{2}$

4. ✔ 2

Question Number : 37 Question Id : 47720321069 Display Question Number : Yes Is Question Mandatory : No

The area of the region bounded by the curve $y = x^2 + 4$, the x-axis and the ordinates at $x=1$ and $x=5$ is

Options :

1. ✖ $\frac{147}{3}$

2. ✔ $\frac{172}{3}$

3. ✖ $\frac{187}{3}$

4. ✖ $\frac{227}{3}$

Question Number : 38 Question Id : 47720321070 Display Question Number : Yes Is Question Mandatory : No

$\lim_{n\to\infty} \sum_{k=0}^{n-1} \frac{1}{\sqrt{n^2-k^2}} =$

Options :

1. ✖ 0

2. ✔

$\frac{\pi}{2}$

3. ✖ π

4. ✖ 2π

Question Number : 39 Question Id : 47720321071 Display Question Number : Yes Is Question Mandatory : No

$\int_0^1 \frac{2x}{1+x^2}\, dx =$

Options :

1. ✖ 1

2. ✖ 2

3. ✔ $log\ 2$

4. ✖ $3\ log\ 2$

Question Number : 40 Question Id : 47720321072 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{e^{ax} - e^{-ax}}{e^{ax} + e^{-ax}}\, dx =$$

(In the following, c is a constant.)

Options :

1. ✔ $\frac{1}{a}\log|e^{ax}+e^{-ax}|+c$

2. ✖ $\frac{1}{a}\log|e^{ax}-e^{-ax}|+c$

3. ✖ $\frac{1}{2a}\log|e^{ax}+e^{-ax}|+c$

4. ✖ $\frac{1}{2a}\log|e^{ax}-e^{-ax}|+c$

Question Number : 41 Question Id : 47720321073 Display Question Number : Yes Is Question Mandatory : No

$$\int_0^{\pi}\frac{e^{\cos x}}{e^{\cos x}+e^{-\cos x}}\,dx=$$

Options :

1. ✖ $-\pi$

2. ✖ 0

3. ✔ $\frac{\pi}{2}$

4. ✖ π

Question Number : 42 Question Id : 47720321074 Display Question Number : Yes Is Question Mandatory : No

$\int_{-\pi}^{\pi} \sin^5 x \, dx =$

Options :

1. ✔ 0

2. ✖ $\frac{\pi}{2}$

3. ✖ π

4. ✖ 2π

Question Number : 43 Question Id : 47720321075 Display Question Number : Yes Is Question Mandatory : No

The area of the region bounded by $y=|x+3|$, the x-axis and the lines $x = -6$ and $x = 0$ is

Options :

1. ✖ *3 square units*

2. ✔ *9 square units*

3. ✖ *12 square units*

4. ✖ *18 square units*

Question Number : 44 Question Id : 47720321076 Display Question Number : Yes Is Question

Mandatory : No

The degree of the differential equation $7x\left(\frac{dy}{dx}\right)^2 - \frac{d^2y}{dx^2} + 10y = \log x$ is

Options :

1. ✔ 1

2. ✖ 2

3. ✖ 3

4. ✖ 4

Question Number : 45 Question Id : 47720321077 Display Question Number : Yes Is Question Mandatory : No

The solution of the differential equation $\frac{dy}{dx} = y\tan x$, given that $y=1$ when $x=0$, is given by

Options :

1. ✖ $y = \cos x$

2. ✖ $y = \cos 2x$

3. ✔ $y = \sec x$

4. ✖ $y = \sec 2x$

Question Number : 46 Question Id : 47720321078 Display Question Number : Yes Is Question Mandatory : No

The solution to the differential equation $(3x^2 + y)\frac{dx}{dy} = x,\ (x > 0)$, such that $y=1$ if $x=1$ is

Options :

1. ✖ $y = 2x^2 - x$

2. ✔ $y = 3x^2 - 2x$

3. ✖ $y = 4x^2 - 3x$

4. ✖ $y = 5x^2 - 4x$

Question Number : 47 Question Id : 47720321079 Display Question Number : Yes Is Question Mandatory : No

The differential equation of the family of parabolas having vertex at the origin and axis along the positive y-axis is

Options :

1. ✖ $xy' = 2$

2. ✔ $xy' = 2y$

3. ✖ $xy' = -2y$

4. ✖ $xy' = 2y^2$

Question Number : 48 Question Id : 47720321080 Display Question Number : Yes Is Question

Mandatory : No

The solution of the differential equation $\frac{dy}{dx} + y\cot x = 4x\,\mathrm{cosec}\,x,\ (x \neq 0)$, given that $y=0$ when $x = \frac{\pi}{2}$ is

Options :

1. ✖ $y\,\mathrm{cosec}\,x = x^2 - \frac{\pi^2}{4}$

2. ✖ $y\,\mathrm{cosec}\,x = 2x^2 - \frac{\pi^2}{2}$

3. ✖ $y\sin x = x^2 - \frac{\pi^2}{4}$

4. ✔ $y\sin x = 2x^2 - \frac{\pi^2}{2}$

Question Number : 49 Question Id : 47720321081 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $log_e\left(\frac{dy}{dx}\right) = ax + by$ is given by

Options :

1. ✖ $ae^{ax} + be^{-by} + C = 0$

2. ✖ $ae^{ax} - be^{-by} + C = 0$

3. ✔ $\frac{1}{a}e^{ax} + \frac{1}{b}e^{-by} + C = 0$

4. ✖ $\frac{1}{a}e^{ax} - \frac{1}{b}e^{-by} + C = 0$

Question Number : 50 Question Id : 47720321082 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 + D - 2)y = \sin x$ is given by

Options :

1. ✖ $-\frac{1}{10}(cos\ x + \sin x)$

2. ✔ $-\frac{1}{10}(cos\ x + 3\sin x)$

3. ✖ $-\frac{1}{10}(cos\ 3x + \sin 3x)$

4. ✖ $-\frac{1}{10}(3\ cos\ x + \sin x)$

Physics

Section Id :	477203414
Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and	Yes

Clear Response :

Question Number : 51 Question Id : 47720321083 Display Question Number : Yes Is Question Mandatory : No

The dimensional formula for gravitational constant, G is

Options :

1. ✖ $M^1L^3T^{-2}$

2. ✔ $M^{-1}L^3T^{-2}$

3. ✖ $M^0L^3T^{-2}$

4. ✖ $M^2L^3T^{-2}$

Question Number : 52 Question Id : 47720321084 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ electric field = Newton/Coulomb

2. ✖ surface tension = Newton/meter

3. ✔ energy = kg m/s

4. ✖ pressure = Newton/m^2

Question Number : 53 Question Id : 47720321085 Display Question Number : Yes Is Question Mandatory : No

A vector A is along positive x-axis. If B is another vector such that AxB is zero, then B could be

Options :

1. ✖ $4\hat{j}$

2. ✔ $-4\hat{i}$

3. ✖ $-(\hat{i}+\hat{j})$

4. ✖ $(\hat{j}+\hat{k})$

Question Number : 54 Question Id : 47720321086 Display Question Number : Yes Is Question Mandatory : No

The scalar product of two vectors is $2\sqrt{3}$ and the magnitude of their vector product is 2. The angle between them is

Options :

1. ✔ 30^0

2. ✖ 45^0

3. ✖ 60^0

4. ✖ 90^0

Question Number : 55 Question Id : 47720321087 Display Question Number : Yes Is Question

Mandatory : No

The work done by a force is defined as W=**F.S**. In a certain situation **F** and **S** are not zero but the work done is zero when

Options :

1. ✖ **F** and **S** are in the same direction

2. ✖ **F** and **S** are in opposite direction

3. ✔ **F** and **S** are at right angles

4. ✖ **F** and **S** are at 45^0

Question Number : 56 Question Id : 47720321088 Display Question Number : Yes Is Question Mandatory : No

A body starts from rest and travels a distance x in first two seconds and a distance y in next two seconds. The relation between x and y is

Options :

1. ✖ $y = 4x$

2. ✖ $y = x$

3. ✔ $y = 3x$

4. ✖ $y = 2x$

Question Number : 57 Question Id : 47720321089 Display Question Number : Yes Is Question

Mandatory : No

A projectile is projected with initial velocity $(6\hat{i} + 8\hat{j})$ m/s. If g = 10 m/s^2 then horizontal range is

Options :

1. ✖ 4.8 m

2. ✔ 9.6 m

3. ✖ 19.2 m

4. ✖ 14.0 m

Question Number : 58 Question Id : 47720321090 Display Question Number : Yes Is Question Mandatory : No

The maximum range of a projectile fired with some initial velocity is found to be 1000 m/s, in the absence of wind and air resistance. The maximum height reached by this projectile is

Options :

1. ✔ 250 m

2. ✖ 500 m

3. ✖ 1000 m

4. ✖ 2000 m

Question Number : 59 Question Id : 47720321091 Display Question Number : Yes Is Question

Mandatory : No

The force of friction between two bodies is

Options :

1. ✔ parallel to the contact surface

2. ✖ perpendicular to the contact surface

3. ✖ inclined at 30^0 to the contact surface

4. ✖ inclined at 60^0 to the contact surface

Question Number : 60 Question Id : 47720321092 Display Question Number : Yes Is Question Mandatory : No

A body is sliding down an inclined plane under its own weight at constant speed. If the inclination of the plane to the horizontal is 30^0, the angle of friction is

Options :

1. ✔ 30^0

2. ✖ 60^0

3. ✖ 45^0

4. ✖ 90^0

Question Number : 61 Question Id : 47720321093 Display Question Number : Yes Is Question Mandatory : No

A block of mass 5 kg is resting on a smooth surface. At what angle, a force of 20 N be acted on the body so that it will acquire a kinetic energy of 40 J after moving 4m

Options :

1. ✖ 30^0

2. ✖ 45^0

3. ✔ 60^0

4. ✖ 120^0

Question Number : 62 Question Id : 47720321094 Display Question Number : Yes Is Question Mandatory : No

Two men with the weights in the ratio 4:3 run up a staircase in time, in the ratio 12:11. The ratio of power of the first to that of second is

Options :

1. ✖ $\frac{4}{3}$

2. ✖ $\frac{12}{11}$

3. ✖ $\frac{48}{33}$

4. ✔ $\frac{11}{9}$

Question Number : 63 Question Id : 47720321095 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ Solar

2. ✔ Hydel

3. ✖ Tidal

4. ✖ Geothermal

Question Number : 64 Question Id : 47720321096 Display Question Number : Yes Is Question Mandatory : No

The total mechanical energy of a spring-mass system in simple harmonic motion is $E = 0.5\ m\omega^2A^2$. If the oscillating particle is replaced by another particle of double the mass while the amplitude A remains the same. The new mechanical energy is

Options :

1. ✖ 2E

2. ✖ 0.5 E

3. ✖ $\sqrt{2}$ E

4. ✔ E

Question Number : 65 Question Id : 47720321097 Display Question Number : Yes Is Question Mandatory : No

Sound of frequency 1000 Hz from a stationary source is reflected from an object approaching the source at 30 m/s back to a stationary observer located at the source. The speed of sound in air is 330 m/s. The frequency of the sound heard by the observer is

Options :

1. ✔ 1200 Hz

2. ✖ 1000 Hz

3. ✖ 1090 Hz

4. ✖ 1100 Hz

Question Number : 66 Question Id : 47720321098 Display Question Number : Yes Is Question Mandatory : No

The frequency of a pendulum if it is taken from the earth's surface to deep into a mine

Options :

1. ✖ increases

2. ✔ decreases

3. ✖ first increases then decreases

4. ✖ remains unchanged

Question Number : 67 Question Id : 47720321099 Display Question Number : Yes Is Question Mandatory : No

Two waves of lengths 50 cm and 51 cm produced 12 beats per second. The velocity of sound is

Options :

1. ✖ 340 m/s

2. ✖ 2. 331 m/s

3. ✔ 306 m/s

4. ✖ 360 m/s

Question Number : 68 Question Id : 47720321100 Display Question Number : Yes Is Question Mandatory : No

According to reverberation time the final intensity 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 : 47720321101 Display Question Number : Yes Is Question Mandatory : No

An ideal gas has volume V at pressure P and temperature T. Mass of each molecule is m. The density of the gas is

Options :

1. ✖ mKT

2. ✖ $\frac{P}{KT}$

3. ✖ $\frac{P}{KTV}$

4. ✔ $\frac{Pm}{KT}$

Question Number : 70 Question Id : 47720321102 Display Question Number : Yes Is Question Mandatory : No

Work done by 0.1 mole of a gas at 27^0C to double its volume at constant pressure is (R=2 cal/mol/K)

Options :

1. ✖ 54 cal

2. ✖ 600 cal

3. ✔ 60 cal

4. ✖

546 cal

Question Number : 71 Question Id : 47720321103 Display Question Number : Yes Is Question Mandatory : No

If the pressure of a gas contained in a closed vessel is increased by 0.4%, when heated by 1^0C, its initial temperature is

Options :

1. ✔ 250 K

2. ✖ 150 K

3. ✖ 100 K

4. ✖ 50 K

Question Number : 72 Question Id : 47720321104 Display Question Number : Yes Is Question Mandatory : No

A monoatomic ideal gas, initially at temperature T_1 is enclosed in a cylinder fitted with a frictionless piston. The gas is allowed to expand adiabatically to a temperature T_2 by releasing the piston suddenly. If L_1 and L_2 are the lengths of the gas column, before and after expansion respectively, T_1/T_2 is given by

Options :

1. ✖ $\left(\frac{L_1}{L_2}\right)^{2/3}$

2. ✔ $\left(\frac{L_2}{L_1}\right)^{2/3}$

3. ✖ $\frac{L_1}{L_2}$

4. ✖ $\frac{L_2}{L_1}$

Question Number : 73 Question Id : 47720321105 Display Question Number : Yes Is Question Mandatory : No

A Carnot's engine operates with source at 127^0C and sink at 27^0 C. If the source supplies 40 kJ of heat energy, the work done by the engine is

Options :

1. ✖ 30 kJ

2. ✔ 10 kJ

3. ✖ 4 kJ

4. ✖ 1 kJ

Question Number : 74 Question Id : 47720321106 Display Question Number : Yes Is Question Mandatory : No

The optical fibre consisting of a central core is cladded by material of

Options :

1. ✔ slightly lower refractive index

2. ✖

slightly higher refractive index

3. ✖ equal refractive index

4. ✖ very high refractive index

Question Number : 75 Question Id : 47720321107 Display Question Number : Yes Is Question Mandatory : No

The susceptibility of the superconductor is

Options :

1. ✖ positive and small

2. ✖ negative and small

3. ✖ positive and unity

4. ✔ negative and unity

Chemistry

Section Id :	477203415
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

Question Number : 76 Question Id : 47720321108 Display Question Number : Yes Is Question Mandatory : No

The nucleus of tritium consists of ---------

Options :

1. ✖ 1 proton + 1 neutron

2. ✖ 1 proton + 3 neutrons

3. ✖ 1 proton + zero neutron

4. ✔ 1 proton + 2 neutrons

Question Number : 77 Question Id : 47720321109 Display Question Number : Yes Is Question Mandatory : No

Which of the following electronic configuration is not possible?

Options :

1. ✖ $1s^2 2s^2 2p^6$

2. ✔ $1s^2 2s^2 2p^7$

3. ✖ $1s^2 2s^2$

4. ✖ $1s^2 2s^2 2p^5$

Question Number : 78 Question Id : 47720321110 Display Question Number : Yes Is Question Mandatory : No

Radius of 3rd Bohr orbit of hydrogen atom is ------

Options :

1. ✖ $6.529A^0$

2. ✔ $4.761A^0$

3. ✖ $2.116A^0$

4. ✖ $8.464A^0$

Question Number : 79 Question Id : 47720321111 Display Question Number : Yes Is Question Mandatory : No

Covalent compounds are generally soluble in --------

Options :

1. ✔ Non-polar solvents

2. ✖ Polar solvents

3. ✖ Concentrated acids

4. ✖ All solvents

Question Number : 80 Question Id : 47720321112 Display Question Number : Yes Is Question Mandatory : No

Six electrons are mutually shared in ---------

Options :

1. ✖ F_2

2. ✖ Cl_2

3. ✖ O_2

4. ✔ N_2

Question Number : 81 Question Id : 47720321113 Display Question Number : Yes Is Question Mandatory : No

To half the molarity of a solution, the following should be adopted.

Options :

1. ✖ Weight of the solute to be doubled

2. ✖ Weight of the solvent to be doubled

3. ✖ Volume of the solvent to be doubled

4. ✔ Volume of the solution to be doubled

Question Number : 82 Question Id : 47720321114 Display Question Number : Yes Is Question Mandatory : No

The molecular weight of $KMnO_4$ is "M". In a reaction $KMnO_4$ is reduced to K_2MnO_4. The equivalent weight of $KMnO_4$ is

Options :

1. ✔ M

2. ✖ M/2

3. ✖ M/3

4. ✖ M/4

Question Number : 83 Question Id : 47720321115 Display Question Number : Yes Is Question Mandatory : No

Calculate the weight of NaOH present in 500 ml of 0.5 N Solution

Options :

1. ✖ 5 g

2. ✔ 10 g

3. ✖ 12 g

4. ✖ 15 g

Question Number : 84 Question Id : 47720321116 Display Question Number : Yes Is Question Mandatory : No

On addition of NaOH to water

Options :

1. ✖ Ionic product will increase

2. ✖ Ionic product will decrease

3. ✔ No change in ionic product of water

4. ✖ H_3O^+ concentration increases

Question Number : 85 Question Id : 47720321117 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a buffer solution?

Options :

1. ✖ (CH_3COOH/CH_3COONa)

2. ✔ (HCl/NaCl)

3. ✖ (HCOOH/HCOONa)

4. ✖ (NH_4OH/NH_4Cl)

Question Number : 86 Question Id : 47720321118 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a good conductor of electricity?

Options :

1. ✖ Diamond

2. ✔ Graphite

3. ✖ Solid NaCl

4. ✖ Wood

Question Number : 87 Question Id : 47720321119 Display Question Number : Yes Is Question Mandatory : No

Which of the following (1M) conducts more electricity?

Options :

1. ✖ Acetic acid

2. ✖ Boric acid

3. ✖ Phosphorous acid

4. ✔ Sulphuric acid

Question Number : 88 Question Id : 47720321120 Display Question Number : Yes Is Question Mandatory : No

In electrolysis of dilute H_2SO_4, which of the following is liberated at anode in presence of inert electrode?

Options :

1. ✖ H_2

2. ✖ SO_2

3. ✔ O_2

4. ✖ SO_3

Question Number : 89 Question Id : 47720321121 Display Question Number : Yes Is Question Mandatory : No

The EMF of the cell Ni/Ni^{2+} (0.01M)/ Cl^-(0.01M)/Cl_2, Pt is ---V if the SRP of nickel and chlorine electrodes are -0.25V and +1.36V respectively

Options :

1. ✖ + 1.61

2. ✖ - 1.61

3. ✔ + 1.79

4. ✖ - 1.79

Question Number : 90 Question Id : 47720321122 Display Question Number : Yes Is Question Mandatory : No

Which of the following is correct relation used to measures the hardness of water?

Options :

1. ✔ $1\ mg/L = 1\ ppm = 0.07^0Cl = 0.1^0Fr$

2. ✖ $1\ mg/L = 0.1\ ppm = 0.7^0Cl = 0.1^0Fr$

3. ✖ $1\ mg/L = 1\ ppm = 0.7^0Cl = 0.01^0Fr$

4. ✖ $1\ mg/L = 1\ ppm = 0.7^0Cl = 1^0Fr$

Question Number : 91 Question Id : 47720321123 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used as effective coagulant in the municipal water treatment to remove fine suspended and colloidal impurities?

Options :

1. ✖ $Fe_2SO_4(NH_4)_2SO_4.7H_20$

2. ✔ $K_2SO_4 . Al_2(SO_4)_3 . 24H_2O$

3. ✖ $CuSO_4.5H_2O$

4. ✖ $Na_2SO_4.6H_2O$

Question Number : 92 Question Id : 47720321124 Display Question Number : Yes Is Question Mandatory : No

The general chemical formula of zeolite is

Options :

1. ✔ $Na_2O .Al_2O_3 .x\ SiO_2 .y\ H_2O$

2. ✖ $Al_2O_3.H_2O$

3. ✖ $CaSO_4.2H_2O$

4. ✖ $MgSO_4.5H_2O$

Question Number : 93 Question Id : 47720321125 Display Question Number : Yes Is Question Mandatory : No

----- is resulted when electrochemical corrosion happened in acidic environment.

Options :

1. ✖ Evolution of oxygen

2. ✖ Absorption of oxygen

3. ✔ Evolution of hydrogen

4. ✖ Absorption of hydrogen

Question Number : 94 Question Id : 47720321126 Display Question Number : Yes Is Question Mandatory : No

Impure metal corrodes faster than pure metal due to

Options :

1. ✔ Heterogeneity

2. ✖ Homogeneity

3. ✖ Non-galvanic cell

4. ✖ localize corrosion

Question Number : 95 Question Id : 47720321127 Display Question Number : Yes Is Question Mandatory : No

The number of repeating units in a polymer is called

Options :

1. ✖ Functionality

2. ✖ Tacticity

3. ✔ degree of polymerization

4. ✖ Specificity

Question Number : 96 Question Id : 47720321128 Display Question Number : Yes Is Question Mandatory : No

The process of vulcanisation makes rubber --------

Options :

1. ✖ Soft

2. ✔ Hard

3. ✖ Elastic

4. ✖ Swells oils

Question Number : 97 Question Id : 47720321129 Display Question Number : Yes Is Question Mandatory : No

Which of the following is thermosetting plastic

Options :

1. ✖ PVC

2. ✖ Polystyrene

3. ✖ Teflon

4. ✔ Bakelite

Question Number : 98 Question Id : 47720321130 Display Question Number : Yes Is Question Mandatory : No

The boiling range of petrol fraction is found to be

Options :

1. ✖ 120^0C-180^0C

2. ✖ 250^0C-320^0C

3. ✔ 40^0C-120^0C

4. ✖ 180^0C-250^0C

Question Number : 99 Question Id : 47720321131 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a common component of photochemical smog?

Options :

1. ✖ Ozone

2. ✖ Acrolein

3. ✖ Peroxyacetyl nitrate

4. ✔ Chlorofluorocarbons

Question Number : 100 Question Id : 47720321132 Display Question Number : Yes Is Question Mandatory : No

White lung cancer is caused by

Options :

1. ✖ Asbestos

2. ✔ Textiles

3. ✖ Paper

4. ✖ Silica

Mechanical Engineering

Section Id :	477203416
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

Question Number : 101 Question Id : 47720321133 Display Question Number : Yes Is Question Mandatory : No

The hacksaw blade using in hand sawing operation removes the material in _____

Options :

1. ✔ Forward stroke

2. ✖ Reverse stroke

3. ✖ Expansion stroke

4. ✖ Backward stroke

Question Number : 102 Question Id : 47720321134 Display Question Number : Yes Is Question Mandatory : No

Which of the following post processes are required for the cutting edge of the chisel?

Options :

1. ✖ Hardening only

2. ✖ Tempering only

3. ✔ Both hardening and tempering

4. ✖ Carburising

Question Number : 103 Question Id : 47720321135 Display Question Number : Yes Is Question Mandatory : No

Which of the following is internationally accepted and recognized unit system?

Options :

1. ✖ FPS

2. ✔ SI

3. ✖ MKS

4. ✖ CGS

Question Number : 104 Question Id : 47720321136 Display Question Number : Yes Is Question Mandatory : No

What is the approximate size of slip gauges?

Options :

1. ✖ 40 mm long and 20 mm wide

2. ✖ 30 mm long and 15 mm wide

3. ✖ 25 mm long and 10 mm wide

4. ✔ 30 mm long and 10 mm wide

Question Number : 105 Question Id : 47720321137 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a drilling machine related operation?

Options :

1. ✖ Counter sinking

2. ✖ Counter boring

3. ✔ Knurling

4. ✖ Centre drilling

Question Number : 106 Question Id : 47720321138 Display Question Number : Yes Is Question Mandatory : No

What is the function of chasing dial in centre lathe?

Options :

1. ✔ To pick up the thread accurately at the begging of each cut

2. ✖ To perform taper turning

3. ✖ To perform knurling

4. ✖ To perform facing

Question Number : 107 Question Id : 47720321139 Display Question Number : Yes Is Question Mandatory : No

Which of the following operation cannot be performed on Lathe?

Options :

1. ✖ Drilling a hole along the axis of the workpiece

2. ✔ Drilling a hole perpendicular to the axis of the workpiece

3. ✖ External tapering on the workpiece

4. ✖ External thread cutting on the workpiece

Question Number : 108 Question Id : 47720321140 Display Question Number : Yes Is Question Mandatory : No

For performing single start threading operation on centre lathe, the rake angle of the single point cutting tool should be _____?

Options :

1. ✖ 5°

2. ✖ 10°

3. ✖ 8°

4. ✔ 0°

Question Number : 109 Question Id : 47720321141 Display Question Number : Yes Is Question Mandatory : No

Which of the following is true with respect to Honing operation?

Options :

1. ✖ Rotary motion is given to workpiece and tool is stationary

2. ✖ Tool and workpiece rotate in opposite direction

3. ✔ Workpiece is stationary and the tool is rotating and reciprocating

4. ✖ Tool and workpiece rotate in the same direction

Question Number : 110 Question Id : 47720321142 Display Question Number : Yes Is Question Mandatory : No

Which of the following machining processes does not use multipoint cutting tools?

Options :

1. ✖ Milling

2. ✖ Drilling

3. ✖ Grinding

4. ✔ Forging

Question Number : 111 Question Id : 47720321143 Display Question Number : Yes Is Question Mandatory : No

In planing operation, the cutting motion is given to _____ and the feed motion is given to _____

Options :

1. ✔ Workpiece, tool

2. ✖ Tool, workpiece

3. ✖ Tool, tool

4. ✖ Workpiece, workpiece

Question Number : 112 Question Id : 47720321144 Display Question Number : Yes Is Question Mandatory : No

G01 is the computer numerical controlled machine code for _____

Options :

1. ✖ Circular interpolation clockwise direction

2. ✖ Circular interpolation counter clockwise direction

3. ✔ Linear interpolation

4. ✖ Staring the spindle

Question Number : 113 Question Id : 47720321145 Display Question Number : Yes Is Question Mandatory : No

In computer numerically controlled turning machine tools, the unit for feed is _____

Options :

1. ✖ Degrees/millimetres

2. ✔ Millimetres/revolution

3. ✖ Revolution/millimetres

4. ✖ Millimetres/hour

Question Number : 114 Question Id : 47720321146 Display Question Number : Yes Is Question Mandatory : No

Which of the following welding process does not use consumable electrode for joining two plates?

Options :

1. ✖ Submerged arc welding

2. ✖ Manual metal arc welding

3. ✔ Tungsten inert gas welding

4. ✖ Metal inert gas welding

Question Number : 115 Question Id : 47720321147 Display Question Number : Yes Is Question Mandatory : No

Which of the following welding process is generally used to weld plastic materials?

Options :

1. ✔ Ultrasonic welding

2. ✖ Tungsten inert gas welding

3. ✖ Manual metal arc welding

4. ✖ Submerged arc welding

Question Number : 116 Question Id : 47720321148 Display Question Number : Yes Is Question Mandatory : No

Edge preparation is not required in welding process if the thickness of the plates to be joined is less than _____

Options :

1. ✖ 10 mm

2. ✔ 5 mm

3. ✖ 15 mm

4. ✖ 20 mm

Question Number : 117 Question Id : 47720321149 Display Question Number : Yes Is Question Mandatory : No

Which of the following defect is related to welding processes?

Options :

1. ✖ Mismatch

2. ✖ Cold shut

3. ✖ Misrun

4. ✔ Undercut

Question Number : 118 Question Id : 47720321150 Display Question Number : Yes Is Question

Mandatory : No

The hot working process is generally carried out at a temperature _____

Options :

1. ✖ Greater than room temperature

2. ✔ Greater than recrystallization temperature

3. ✖ Less than recrystallization temperature

4. ✖ Greater than melting point

Question Number : 119 Question Id : 47720321151 Display Question Number : Yes Is Question Mandatory : No

_____ allowance is provided on the pattern for easy removal without destroying the vertical walls of mould from the mould

Options :

1. ✖ Shake

2. ✖ Shrinkage

3. ✔ Draft

4. ✖ Ramming

Question Number : 120 Question Id : 47720321152 Display Question Number : Yes Is Question

Mandatory : No

Which of the following is not a defect of casting process?

Options :

1. ✖ Blow holes

2. ✔ Incomplete fusion

3. ✖ Pin holes

4. ✖ Shrinkage cavity

Question Number : 121 Question Id : 47720321153 Display Question Number : Yes Is Question Mandatory : No

Which of the following properties does a moulding sand should have to pass the hot gasses/vapour from the mould after pouring or during pouring?

Options :

1. ✖ Collapsibility

2. ✖ Refractoriness

3. ✖ Cohesiveness

4. ✔ Permeability

Question Number : 122 Question Id : 47720321154 Display Question Number : Yes Is Question Mandatory : No

If the maximum size of shaft is greater than the maximum size of hole, then the possible fit is _____

Options :

1. ✖ Clearance fit

2. ✔ Interference fit

3. ✖ Transition fit

4. ✖ Slide fit

Question Number : 123 Question Id : 47720321155 Display Question Number : Yes Is Question Mandatory : No

In a bilateral tolerance system, the tolerance is provided on _____

Options :

1. ✖ One side of actual size

2. ✖ One side of nominal size

3. ✖ Both sides of actual size

4. ✔ Both sides of nominal size

Question Number : 124 Question Id : 47720321156 Display Question Number : Yes Is Question Mandatory : No

How many number of tolerance grades are available according to Indian standards?

Options :

1. ✖ 25

2. ✔ 18

3. ✖ 8

4. ✖ 12

Question Number : 125 Question Id : 47720321157 Display Question Number : Yes Is Question Mandatory : No

In a bilateral tolerance system, the shaft is specified as $25^{+0.05}_{-0.02}$ mm. The tolerance provided on the shaft is _____

Options :

1. ✖ 0.05 mm

2. ✖ 0.02 mm

3. ✖ 0.03 mm

4. ✔ 0.07 mm

Question Number : 126 Question Id : 47720321158 Display Question Number : Yes Is Question

Mandatory : No

The average surface roughness of a component is 6.3 µm. The ISO surface roughness grade is _____

Options :

1. ✔ N9

2. ✖ N12

3. ✖ N4

4. ✖ N1

Question Number : 127 Question Id : 47720321159 Display Question Number : Yes Is Question Mandatory : No

In conventional drawing, the line drawn by repeating a long section followed by shot dash again long section represents _____

Options :

1. ✖ Hidden features

2. ✖ Radius of a circle

3. ✔ Central axis a cylinder

4. ✖ Centre of a circle

Question Number : 128 Question Id : 47720321160 Display Question Number : Yes Is Question

Mandatory : No

An unknown material can be specified as a brittle material if its percentage of elongation is _____ in uniaxial tensile testing

Options :

1. ✖ 5 – 10 %

2. ✖ 15 – 20 %

3. ✖ 20 – 25 %

4. ✔ < 5 %

Question Number : 129 Question Id : 47720321161 Display Question Number : Yes Is Question Mandatory : No

Cast iron is a_____

Options :

1. ✔ Brittle material

2. ✖ Tougher material

3. ✖ Resilient material

4. ✖ Ductile material

Question Number : 130 Question Id : 47720321162 Display Question Number : Yes Is Question Mandatory : No

Which of the following testing comes under the category of non-destructive testing method?

Options :

1. ✖ Uniaxial tensile test

2. ✖ Izod impact test

3. ✔ Dye penetrate test

4. ✖ Bending test

Question Number : 131 Question Id : 47720321163 Display Question Number : Yes Is Question Mandatory : No

In iron and iron carbide diagram, the maximum percentage of carbon is _____

Options :

1. ✖ 1.7 %

2. ✔ 6.67 %

3. ✖ 4.3 %

4. ✖ 0.8 %

Question Number : 132 Question Id : 47720321164 Display Question Number : Yes Is Question Mandatory : No

What is the percentage of carbon in mild steel?

Options :

1. ✔ Less than 0.5 %

2. ✖ Between 0.5 % and 3 %

3. ✖ Between 3 % and 6.67 %

4. ✖ More than 6.67 %

Question Number : 133 Question Id : 47720321165 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a non-ferrous alloy?

Options :

1. ✔ Brass

2. ✖ Mild steel

3. ✖ Cast iron

4. ✖ High carbon steel

Question Number : 134 Question Id : 47720321166 Display Question Number : Yes Is Question Mandatory : No

If two forces are said to be collinear, then _____

Options :

1. ✔ The line of action of the two forces is same

2. ✖ The line of action of the two forces is perpendicular

3. ✖ The line of action of the two forces is at obtuse angle

4. ✖ The line of action of the two forces is at an acute angle

Question Number : 135 Question Id : 47720321167 Display Question Number : Yes Is Question Mandatory : No

Two forces with same magnitude (100 N) but opposite in direction are acting on a body. If the line of action of these forces is same, then the net resultant force magnitude acting on the body is _____

Options :

1. ✖ 100 N

2. ✖ 200 N

3. ✖ 50 N

4. ✔ Zero

Question Number : 136 Question Id : 47720321168 Display Question Number : Yes Is Question Mandatory : No

Up to which point on stress strain curve, the Hooke's law is valid?

Options :

1. ✖ Ultimate tensile strength point

2. ✔ Proportionality limit

3. ✖ Lower yield point

4. ✖ Fracture point

Question Number : 137 Question Id : 47720321169 Display Question Number : Yes Is Question Mandatory : No

The ability of the material that absorbs energy till its fracture is known as _____

Options :

1. ✖ Brittleness

2. ✖ Ductileness

3. ✔ Toughness

4. ✖ Malleability

Question Number : 138 Question Id : 47720321170 Display Question Number : Yes Is Question Mandatory : No

If a simply supported beam is loaded with point load at its midpoint of the beam, then the deflection is maximum at its _____

Options :

1. ✖ Hinged supported end

2. ✖ Roller supported end

3. ✖ Both at roller and hinged supports

4. ✔ Midpoint of the beam

Question Number : 139 Question Id : 47720321171 Display Question Number : Yes Is Question Mandatory : No

If a cantilever beam is subjected to a point load at its free end, the shear stresses in the beam is _____

Options :

1. ✖ Increasing gradually

2. ✖ Decreasing gradually

3. ✔ Constant

4. ✖ Zero

Question Number : 140 Question Id : 47720321172 Display Question Number : Yes Is Question Mandatory : No

The stresses produced in belt drive are _____

Options :

1. ✔ Tensile stresses

2. ✖ Compressive stresses

3. ✖ Shear stresses

4. ✖ Both compressive and shear stresses

Question Number : 141 Question Id : 47720321173 Display Question Number : Yes Is Question Mandatory : No

Which of the following is a positive drive?

Options :

1. ✖ Rope drive

2. ✔ Chain drive

3. ✖ Flat belt drive

4. ✖ V-belt drive

Question Number : 142 Question Id : 47720321174 Display Question Number : Yes Is Question Mandatory : No

A helical spring with stiffness of 100 N/m is cut into two parts .
What is the stiffness of each part of the cut spring?

Options :

1. ✖ 25 N/m

2. ✖ 100 N/m

3. ✔ 200 N/m

4. ✖ 50 N/m

Question Number : 143 Question Id : 47720321175 Display Question Number : Yes Is Question Mandatory : No

Let P is the tension in the flat belt due to centrifugal force. To achieve maximum power transmission with the flat belt drive, the maximum tension in the belt should be _____

Options :

1. ✔ 3P

2. ✖ P

3. ✖ 0.333P

4. ✖ 2P

Question Number : 144 Question Id : 47720321176 Display Question Number : Yes Is Question Mandatory : No

A flange coupling is used for _____

Options :

1. ✖ Intersecting shafts

2. ✔ Collinear shafts

3. ✖ Small shafts rotating at slow speeds

4. ✖ Parallel shafts

Question Number : 145 Question Id : 47720321177 Display Question Number : Yes Is Question Mandatory : No

A key in the shape of semi-circular disk with uniform thickness is called as _____

Options :

1. ✖ Sunk key

2. ✖ Feather key

3. ✔ Woodruff key

4. ✖ Kennedy key

Question Number : 146 Question Id : 47720321178 Display Question Number : Yes Is Question Mandatory : No

The function of fly wheel is to _____

Options :

1. ✔ Limit the fluctuations of speed during each cycle

2. ✖ Control the means speed of the engine

3. ✖ Maintain constant speed

4. ✖ Come into action when the speed varies due to varying load.

Question Number : 147 Question Id : 47720321179 Display Question Number : Yes Is Question Mandatory : No

Which of the following threads are used for screw jacks?

Options :

1. ✖ Trapezoidal threads

2. ✖ V threads

3. ✖ Buttress threads

4. ✔ Square threads

Question Number : 148 Question Id : 47720321180 Display Question Number : Yes Is Question Mandatory : No

The specification of a thread is given as M 20 × 2. Which of the following is true?

Options :

1. ✖ It is a metric thread of 20 mm major diameter with 2 cm pitch

2. ✖ It is a metric thread of 20 mm pitch diameter with 2 cm pitch

3. ✔ It is a metric thread of 20 mm pitch diameter with 2 mm pitch

4. ✖ It is a metric thread of 20 mm major diameter with 2 mm pitch

Question Number : 149 Question Id : 47720321181 Display Question Number : Yes Is Question Mandatory : No

The thickness of the gear tooth is measured along the _____

Options :

1. ✔ Pitch circle

2. ✖ Base circle

3. ✖ Addendum circle

4. ✖ Root circle

Question Number : 150 Question Id : 47720321182 Display Question Number : Yes Is Question Mandatory : No

The size of the gear is specified by _____

Options :

1. ✖ Circular pitch

2. ✖ Diametral pitch

3. ✖ Pitch circle diameter

4. ✔ Module.

Question Number : 151 Question Id : 47720321183 Display Question Number : Yes Is Question Mandatory : No

The value of universal gas constant is _____

Options :

1. ✖ 80.314 J/kgK

2. ✖ 830.14 J/kgK

3. ✖ 28.7 J/kgK

4. ✔ 8314 J/kgK

Question Number : 152 Question Id : 47720321184 Display Question Number : Yes Is Question Mandatory : No

Which of the following is true?

Options :

1. ✖ Atmospheric pressure = gauge pressure + absolute pressure

2. ✔ Absolute pressure = gauge pressure + atmospheric pressure

3. ✖ Gauge pressure = atmospheric pressure + absolute pressure

4. ✖ Absolute pressure = gauge pressure – atmospheric pressure

Question Number : 153 Question Id : 47720321185 Display Question Number : Yes Is Question Mandatory : No

The absolute zero temperature is taken as _____

Options :

1. ✔ – 273 °C

2. ✖ 273 °C

3. ✖ 273 F

4. ✖ – 273 F

Question Number : 154 Question Id : 47720321186 Display Question Number : Yes Is Question Mandatory : No

Which of the following cycles consists of one constant pressure, one constant volume and two isentropic processes?

Options :

1. ✖ Otto cycle

2. ✖ Carnot cycle

3. ✔ Diesel cycle

4. ✖ Stirling cycle

Question Number : 155 Question Id : 47720321187 Display Question Number : Yes Is Question Mandatory : No

Which of the following represent a first law of thermodynamics?

Options :

1. ✖ Conservation of momentum

2. ✖ Conservation of heat

3. ✖ Conservation of mass

4. ✔ Conservation of energy

Question Number : 156 Question Id : 47720321188 Display Question Number : Yes Is Question Mandatory : No

Which of the following liquid is most volatile and lighter in weight?

Options :

1. ✖ Water

2. ✖ Kerosene

3. ✔ Petrol

4. ✖ Mineral oil

Question Number : 157 Question Id : 47720321189 Display Question Number : Yes Is Question Mandatory : No

Work done in a free expansion process is _____

Options :

1. ✖ Positive

2. ✔ Zero

3. ✖ Maximum

4. ✖ Minimum

Question Number : 158 Question Id : 47720321190 Display Question Number : Yes Is Question Mandatory : No

The change in entropy of an irreversible process is always _____

Options :

1. ✔ Positive

2. ✖ Negative

3. ✖ Remains constant

4. ✖ Zero

Question Number : 159 Question Id : 47720321191 Display Question Number : Yes Is Question Mandatory : No

According to Avogadro's law, at same pressure and temperature, the density of two gases is _____ their molecular masses.

Options :

1. ✖ Equal to

2. ✔ Directly proportional to

3. ✖ Indirectly proportional to

4. ✖ Density does not depend on molecular mass

Question Number : 160 Question Id : 47720321192 Display Question Number : Yes Is Question Mandatory : No

The efficiency of Carnot cycle depends only on _____

Options :

1. ✖ Pressure ratio

2. ✖ Cut-off ratio

3. ✔ Temperature limits

4. ✖ Compression ratio

Question Number : 161 Question Id : 47720321193 Display Question Number : Yes Is Question Mandatory : No

For the same compression ratio, the efficiency of Otto cycle is _____ the diesel cycle.

Options :

1. ✔ Greater than

2. ✖ Less than

3. ✖ Equal to

4. ✖ Half

Question Number : 162 Question Id : 47720321194 Display Question Number : Yes Is Question Mandatory : No

The capacity of the compressor is generally expressed in _____

Options :

1. ✖ kg/m^3

2. ✖ m^3/kg

3. ✖ kg/m^2

4. ✔ m^3/min

Question Number : 163 Question Id : 47720321195 Display Question Number : Yes Is Question Mandatory : No

The dynamic/absolute viscosity is the _____

Options :

1. ✖ Ratio of kinematic viscosity to the density of the liquid

2. ✖ Ratio of density of the liquid to the kinematic viscosity

3. ✔ Product of kinematic viscosity and density of the liquid

4. ✖ Product of kinematic viscosity and mass of the liquid

Question Number : 164 Question Id : 47720321196 Display Question Number : Yes Is Question Mandatory : No

The number of blades for a Kaplan turbine runner is generally varies from _____

Options :

1. ✖ 16 to 24

2. ✖ 8 to 16

3. ✖ 2 to 4

4. ✔ 4 to 8

Question Number : 165 Question Id : 47720321197 Display Question Number : Yes Is Question Mandatory : No

Discharge of a centrifugal pump is _____ of the impeller

Options :

1. ✔ Directly proportional to the $(\text{diameter})^2$

2. ✖ Inversely proportional to the diameter

3. ✖ Directly proportional to the diameter

4. ✖ Inversely proportional to the $(diameter)^2$

Question Number : 166 Question Id : 47720321198 Display Question Number : Yes Is Question Mandatory : No

To avoid the cavitation in centrifugal pump the _____ pressure should be higher than vapour pressure

Options :

1. ✖ Delivery

2. ✖ Static

3. ✔ Suction

4. ✖ Dynamic

Question Number : 167 Question Id : 47720321199 Display Question Number : Yes Is Question Mandatory : No

In which of the following ranges of water head, it would be more preferable to use Francis turbine?

Options :

1. ✖ 0 to 25 m

2. ✔ 25 to 250 m

3. ✖ 250 to 1000 m

4. ✖ More than 1000 m

Question Number : 168 Question Id : 47720321200 Display Question Number : Yes Is Question Mandatory : No

At a constant head and discharge, what should be the speed ratio for a Pelton wheel to get maximum efficiency?

Options :

1. ✖ 0.35

2. ✖ 0.56

3. ✔ 0.45

4. ✖ 0.26

Question Number : 169 Question Id : 47720321201 Display Question Number : Yes Is Question Mandatory : No

To achieve higher hydraulic efficiency of an impulse turbine, the velocity of the wheel should be _____ of the jet velocity

Options :

1. ✔ One-half

2. ✖ Three-fourth

3. ✖ Double

4. ✖ One-fourth

Question Number : 170 Question Id : 47720321202 Display Question Number : Yes Is Question Mandatory : No

If H is the head of water, then the discharge through turbine (Pelton wheel) is _____

Options :

1. ✖ Inversely proportional to $H^{3/2}$

2. ✖ Inversely proportional to $H^{1/2}$

3. ✖ Directly proportional to $H^{3/2}$

4. ✔ Directly proportional to $H^{1/2}$

Question Number : 171 Question Id : 47720321203 Display Question Number : Yes Is Question Mandatory : No

The total energy line lies over the centre line of the pipe by an amount equal to _____

Options :

1. ✖ Velocity head

2. ✖ Pressure head

3. ✔ Velocity + pressure head

4. ✖ Pressure – velocity head

Question Number : 172 Question Id : 47720321204 Display Question Number : Yes Is Question Mandatory : No

The dryness fraction (x) of a super-heated steam is _____

Options :

1. ✖ $x = 0.5$

2. ✖ $x = 0.9$

3. ✖ $x = 0$

4. ✔ $x = 1$

Question Number : 173 Question Id : 47720321205 Display Question Number : Yes Is Question Mandatory : No

At a constant pressure, the temperature at which the pure liquid phase transforms into vapour phase is known as _____

Options :

1. ✖ Normal temperature

2. ✔ Saturated temperature

3. ✖ Evaporative temperature

4. ✖

Dew point temperature

Question Number : 174 Question Id : 47720321206 Display Question Number : Yes Is Question Mandatory : No

In which of the following devices, the flow is generally considered as adiabatic?

Options :

1. ✔ Nozzle

2. ✖ Evaporator

3. ✖ Condenser

4. ✖ Chimney

Question Number : 175 Question Id : 47720321207 Display Question Number : Yes Is Question Mandatory : No

The function of a steam nozzle is to convert _____

Options :

1. ✖ Heat energy of the steam to potential energy

2. ✔ Heat energy of the steam to kinetic energy

3. ✖ Thermal energy of the steam to potential energy

4. ✖ Heat energy of the steam to thermal energy

Question Number : 176 Question Id : 47720321208 Display Question Number : Yes Is Question Mandatory : No

The ratio of actual enthalpy drop to the isentropic enthalpy drop is known as _____

Options :

1. ✖ Stage efficiency

2. ✖ Coulomb efficiency

3. ✖ Rankine efficiency

4. ✔ Internal/nozzle efficiency

Question Number : 177 Question Id : 47720321209 Display Question Number : Yes Is Question Mandatory : No

The axial thrust in a reaction turbine is because of _____ across the rotor

Options :

1. ✔ Pressure and axial velocity drop

2. ✖ Pressure and temperature drop

3. ✖ Temperature and axial velocity drop

4. ✖ Pressure drop only

Question Number : 178 Question Id : 47720321210 Display Question Number : Yes Is Question Mandatory : No

If a nozzle cross-sectional area is continuously decreasing from entrance till certain area and then continuously increases till the exit is known as _____

Options :

1. ✖ Convergent nozzle

2. ✖ Divergent nozzle

3. ✔ Convergent-divergent nozzle

4. ✖ Divergent-convergent nozzle

Question Number : 179 Question Id : 47720321211 Display Question Number : Yes Is Question Mandatory : No

The function of governing system in steam turbines is to _____

Options :

1. ✖ Control the dryness ratio

2. ✔ Maintain the speed of turbine

3. ✖ Maintain required torque

4. ✖ Monitor the axial thrust of the turbine

Question Number : 180 Question Id : 47720321212 Display Question Number : Yes Is Question Mandatory : No

Expansion process in refrigeration cycle is an _____

Options :

1. ✖ Isentropic

2. ✔ Isenthalpic

3. ✖ Isothermal

4. ✖ Isobaric

Question Number : 181 Question Id : 47720321213 Display Question Number : Yes Is Question Mandatory : No

The condenser and evaporator in vapour compression refrigeration cycles operates at constant _____

Options :

1. ✖ Volume

2. ✖ Temperature

3. ✔ Pressure

4. ✖ Entropy

Question Number : 182 Question Id : 47720321214 Display Question Number : Yes Is Question Mandatory : No

If the coefficient of performance (COP) of a heat pump is 5.0, then what would be the coefficient of performance of a refrigerator operating at the same temperatures as the heat pump?

Options :

1. ✖ 3.0

2. ✔ 4.0

3. ✖ 6.0

4. ✖ 5.0

Question Number : 183 Question Id : 47720321215 Display Question Number : Yes Is Question Mandatory : No

The capacity of refrigeration is generally expressed in tonnes. One tonne is equal to _____ amount of heat removal?

Options :

1. ✖ 420 kJ/min

2. ✖ 105 kJ/min

3. ✖ 200 kJ/min

4. ✔ 210 kJ/min

Question Number : 184 Question Id : 47720321216 Display Question Number : Yes Is Question Mandatory : No

In inventory control, the term economic order quantity (EOQ) means _____

Options :

1. ✔ Optimum lot size

2. ✖ Maximum size of warehouse needed

3. ✖ Maximum lot size to be ordered

4. ✖ Lot size resulted from break-even analysis

Question Number : 185 Question Id : 47720321217 Display Question Number : Yes Is Question Mandatory : No

Which type of the following organisation is preferred for steel industry?

Options :

1. ✖ Functional organisation

2. ✖ Line and staff organisation

3. ✔ Line, staff and functional organisation

4. ✖ Line organisation only

Question Number : 186 Question Id : 47720321218 Display Question Number : Yes Is Question Mandatory : No

A diagram that shows the path to be followed by a working staff or materials while performing a task is known as _____

Options :

1. ✖ Travel chart

2. ✖ Flow process chart

3. ✖ String diagram

4. ✔ Flow diagram

Question Number : 187 Question Id : 47720321219 Display Question Number : Yes Is Question Mandatory : No

The work study involves _____

Options :

1. ✖ Method study and Motion study.

2. ✖ Work measurement

3. ✔ Both method study and work measurement

4. ✖

Motion study

Question Number : 188 Question Id : 47720321220 Display Question Number : Yes Is Question Mandatory : No

ABC analysis is generally used in _____

Options :

1. ✖ PERT

2. ✔ Inventory control

3. ✖ CPM

4. ✖ Break-even analysis

Question Number : 189 Question Id : 47720321221 Display Question Number : Yes Is Question Mandatory : No

The total cost in a break-even analysis is a sum of _____

Options :

1. ✖ Fixed cost and revenue

2. ✖ Fixed cost and profit

3. ✖ Variable cost and revenue

4. ✔ Fixed cost and variable cost

Question Number : 190 Question Id : 47720321222 Display Question Number : Yes Is Question Mandatory : No

To manufacture steam turbines, which of the following layout is most appropriate?

Options :

1. ✖ Process layout

2. ✖ Product layout

3. ✔ Fixed position layout

4. ✖ Either process or product layout

Question Number : 191 Question Id : 47720321223 Display Question Number : Yes Is Question Mandatory : No

The full form of PERT is _____

Options :

1. ✖ Planning Estimation and Resulting Technique

2. ✔ Programme Evaluation and Review Technique

3. ✖ Programme Evolution and Resulting Technique

4. ✖ Process Estimation and Resulting Technique

Question Number : 192 Question Id : 47720321224 Display Question Number : Yes Is Question Mandatory : No

In manufacturing management, the term "dispatching" refers to _____

Options :

1. ✔ Dispatching of work orders through shop floor

2. ✖ Dispatching factory mail

3. ✖ Dispatching of sales order

4. ✖ Dispatching of finished product of the user

Question Number : 193 Question Id : 47720321225 Display Question Number : Yes Is Question Mandatory : No

Scheduling is _____

Options :

1. ✖ Concerned with starting of the process

2. ✖ Prescribes the sequence of operations to be followed

3. ✔ Determines the programme for the operations

4. ✖ Regulates the progress of the jobs

Question Number : 194 Question Id : 47720321226 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used to transfer the motion from cam to valves?

Options :

1. ✔ Rocker arms

2. ✖ Camshaft

3. ✖ Connecting rod

4. ✖ Chain drive

Question Number : 195 Question Id : 47720321227 Display Question Number : Yes Is Question Mandatory : No

The piston and connecting rod in an automobile engine are generally connected by _____

Options :

1. ✖ Kingpin

2. ✔ Gudgeon pin

3. ✖ Stud

4. ✖ Rivet

Question Number : 196 Question Id : 47720321228 Display Question Number : Yes Is Question Mandatory : No

In the contest of automobile industry, the full form of ABS is _____

Options :

1. ✖ Antirust Braking System

2. ✖ Automatic Braking System

3. ✖ Auto-lock Braking System

4. ✔ Anti-lock Braking System

Question Number : 197 Question Id : 47720321229 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a part of transmission system of an automobile?

Options :

1. ✖ Differential

2. ✔ Engine

3. ✖ Propeller shaft

4. ✖ Gear box

Question Number : 198 Question Id : 47720321230 Display Question Number : Yes Is Question Mandatory : No

The cross-section of connecting rod resembles _____ shape.

Options :

1. ✖ H

2. ✖ L

3. ✔ I

4. ✖ C

Question Number : 199 Question Id : 47720321231 Display Question Number : Yes Is Question Mandatory : No

The purpose of differential in the automobile transmission system is to_____

Options :

1. ✖ Have same speed to the front wheels

2. ✔ Have different speeds to the rear wheels

3. ✖ Have same speed to the rear wheels

Have different speeds in the front wheels

4. ✖

Question Number : 200 Question Id : 47720321232 Display Question Number : Yes Is Question Mandatory : No

Which of the following is not a part of chassis assembly?

Options :

1. ✖ Front axle

2. ✖ Wheels

3. ✖ Engine

4. ✔ Rear seats