

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.

Question Paper Name :

Agricultural Engineering 19th Sep 2021

Duration :

Shift1

Total Marks :

180

Display Marks:

200

Calculator :

No

Magnifying Glass Required? :

None

Ruler Required? :

No

Eraser Required? :

No

Scratch Pad Required? :

No

Rough Sketch/Notepad Required? :

No

Protractor Required? :

No

Show Watermark on Console? :

No

Highlighter :

Yes

Auto Save on Console? (SA type of questions will be always auto saved) :

No

Is this Group for Examiner? :

Yes

No

Mathematics

Section Id :	477203347
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 : 47720317625 Display Question Number : Yes Is Question Mandatory : No

If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$ then $AB^T =$

Options :

1. ✖ $\begin{bmatrix} 19 & 22 \\ 43 & 50 \end{bmatrix}$

2. ✔ $\begin{bmatrix} 17 & 23 \\ 39 & 53 \end{bmatrix}$

3. ✖ $\begin{bmatrix} 26 & 38 \\ 30 & 44 \end{bmatrix}$

4. ✖ $\begin{bmatrix} 19 & 23 \\ 30 & 53 \end{bmatrix}$

Question Number : 2 Question Id : 47720317626 Display Question Number : Yes Is Question Mandatory : No

If A is any square matrix, then $A - A^T$ is

Options :

1. ✖ a null matrix
2. ✖ an identity matrix
3. ✖ a symmetric matrix
4. ✔ a skew-symmetric matrix

Question Number : 3 Question Id : 47720317627 Display Question Number : Yes Is Question Mandatory : No

If $\begin{vmatrix} 4 & -5 & 6 \\ 7 & x & 8 \\ -1 & 2 & -3 \end{vmatrix} = 0$, then, $x =$

Options :

1. ✖ 0
2. ✖ $-\frac{55}{6}$
3. ✔ $-\frac{15}{2}$
4. ✖ 1

Question Number : 4 Question Id : 47720317628 Display Question Number : Yes Is Question

Mandatory : No

If $A = \begin{bmatrix} 3 & -5 \\ -7 & 2 \end{bmatrix}$, $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and B is a square matrix such that $AB = I$, then, $B =$

Options :

1. ✖ $\begin{bmatrix} 2 & 5 \\ 7 & 3 \end{bmatrix}$

2. ✖ $\begin{bmatrix} -2 & 5 \\ 7 & -3 \end{bmatrix}$

3. ✔ $-\frac{1}{29} \begin{bmatrix} 2 & 5 \\ 7 & 3 \end{bmatrix}$

4. ✖ $-\frac{1}{29} \begin{bmatrix} -2 & 5 \\ 7 & -3 \end{bmatrix}$

Question Number : 5 Question Id : 47720317629 Display Question Number : Yes Is Question

Mandatory : No

If $x = \alpha$, $y = \beta$, $z = \gamma$ is the unique solution of the system of simultaneous linear equations $x - 2y + z = 5$, $2x + y - 2z = -3$ and $x - 2y + 3z = 9$, then, $\gamma =$

Options :

1. ✔ 2

2. ✖ -2

3. ✖ -3

4. ✖ 3

Question Number : 6 Question Id : 47720317630 Display Question Number : Yes Is Question Mandatory : No

If $\frac{4x-22}{3x^2+2x-8} = \frac{A}{x+2} + \frac{B}{3x-4}$, then, $A+B =$

Options :

1. ✔ -2

2. ✖ 0

3. ✖ 2

4. ✖ 4

Question Number : 7 Question Id : 47720317631 Display Question Number : Yes Is Question Mandatory : No

If $\frac{4-7x^2}{3x^3+6x^2} = \frac{A}{x} + \frac{Bx+C}{x^2+2}$, then, $A+C =$

Options :

1. ✖ 0

2. ✔ $\frac{2}{3}$

3. ✖

$$\frac{3}{2}$$

2

4. ✖

Question Number : 8 Question Id : 47720317632 Display Question Number : Yes Is Question Mandatory : No

If $\tan \theta = -\frac{4}{3}$ and θ is not in the second quadrant, then, $\cos \theta + \csc \theta =$

Options :

1. ✔

$$-\frac{13}{20}$$

2. ✖

$$-\frac{1}{5}$$

3. ✖

$$\frac{27}{20}$$

4. ✖

$$\frac{7}{5}$$

Question Number : 9 Question Id : 47720317633 Display Question Number : Yes Is Question Mandatory : No

The sine function, whose period is $\frac{4}{5}$, is

Options :

1. ✖

$\sin \frac{5\pi}{4} x$

$\sin \frac{4\pi}{5} x$

2. ✖

$\sin \frac{5\pi}{2} x$

3. ✔

$\sin \frac{2\pi}{5} x$

4. ✖

Question Number : 10 Question Id : 47720317634 Display Question Number : Yes Is Question Mandatory : No

If $A+B = \frac{3\pi}{4}$, then, $(1 - \tan A)(1 - \tan B) =$

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ -2

Question Number : 11 Question Id : 47720317635 Display Question Number : Yes Is Question Mandatory : No

Mandatory : No

If $0 < A < \frac{\pi}{4}$ and $\sin A = \frac{3}{5}$, then, $\sin 2A + \cos 2A =$

Options :

1. ✖ $\frac{17}{25}$

2. ✖ $\frac{24}{25}$

3. ✖ $\frac{9}{25}$

4. ✔ $\frac{31}{25}$

Question Number : 12 Question Id : 47720317636 Display Question Number : Yes Is Question

Mandatory : No

$$\cos 56^\circ + \sin 26^\circ - \sin 86^\circ =$$

Options :

1. ✖ -1

2. ✔ 0

3. ✖ 1

4. ✖ 2

Question Number : 13 Question Id : 47720317637 Display Question Number : Yes Is Question Mandatory : No

The general solution of the trigonometric equation $\sec x = 4 \cos x$ is $x =$

Options :

1. ✓ $2n\pi \pm \frac{\pi}{3}$ or $2n\pi \pm \frac{2\pi}{3}$

2. ✗ $2n\pi \pm \frac{\pi}{6}$ or $2n\pi \pm \frac{5\pi}{6}$

3. ✗ $2n\pi \pm \frac{\pi}{4}$ or $2n\pi \pm \frac{3\pi}{4}$

4. ✗ $n\pi + (-1)^n \frac{\pi}{3}$ or $n\pi + (-1)^n \frac{2\pi}{3}$

Question Number : 14 Question Id : 47720317638 Display Question Number : Yes Is Question Mandatory : No

The general solution of the trigonometric equation $\cos 4\theta = \cos 3\theta$ is $\theta =$

Options :

1. ✗ $n\pi + \frac{\pi}{6}$

2. ✗ $2n\pi + \frac{\pi}{3}$

3. ✓ $\frac{2n\pi}{7}$ or $2n\pi$

$$\frac{n\pi}{7} \text{ or } n\pi$$

4. ✖

Question Number : 15 Question Id : 47720317639 Display Question Number : Yes Is Question Mandatory : No

$$\cos \left[\frac{\pi}{2} + \cos^{-1} \left(-\frac{3}{5} \right) \right] =$$

Options :

1. ✖ $\frac{4}{5}$

2. ✖ $\frac{3}{5}$

3. ✔ $-\frac{4}{5}$

4. ✖ $-\frac{3}{5}$

Question Number : 16 Question Id : 47720317640 Display Question Number : Yes Is Question Mandatory : No

$$\cot \left[\tan^{-1} \left(\frac{1}{6} \right) + \tan^{-1} \left(\frac{5}{7} \right) \right] =$$

Options :

1. ✖

0

2. ✖ $\frac{1}{\sqrt{3}}$

3. ✔ 1

4. ✖ $\sqrt{3}$

Question Number : 17 Question Id : 47720317641 Display Question Number : Yes Is Question Mandatory : No

In a triangle ABC, if $b = 3$, $c = 4$ and $\cos A = \frac{7}{8}$, then, $a =$

Options :

1. ✖ 5

2. ✔ 2

3. ✖ 6

4. ✖ 8

Question Number : 18 Question Id : 47720317642 Display Question Number : Yes Is Question Mandatory : No

If $i^2 = -1$, then, $(1 - i)^{2020} =$

Options :

1. ✓ -2^{1010}

2. ✗ 2^{1010}

3. ✗ 2^{2020}

4. ✗ -2^{2020}

Question Number : 19 Question Id : 47720317643 Display Question Number : Yes Is Question Mandatory : No

If $i^2 = -1$, then, $(\sqrt{3} + i)^4 + (\sqrt{3} - i)^4 =$

Options :

1. ✗ 32

2. ✗ -32

3. ✗ 16

4. ✓ -16

Question Number : 20 Question Id : 47720317644 Display Question Number : Yes Is Question Mandatory : No

If (1,2) and (2,1) are the ends of one of the diameters of a circle, then the equation of the circle is

Options :

1. ✖ $x^2 + y^2 - 3x - 3y - 4 = 0$

2. ✖ $x^2 + y^2 - 3x + 3y - 4 = 0$

3. ✖ $x^2 + y^2 + 3x - 3y - 4 = 0$

4. ✔ $x^2 + y^2 - 3x - 3y + 4 = 0$

Question Number : 21 Question Id : 47720317645 Display Question Number : Yes Is Question Mandatory : No

The equation of the circle of radius 2 with its centre at (2,2) is

Options :

1. ✔ $x^2 + y^2 - 4x - 4y + 4 = 0$

2. ✖ $x^2 + y^2 + 4x + 4y + 4 = 0$

3. ✖ $x^2 + y^2 - 4x - 4y + 12 = 0$

4. ✖ $x^2 + y^2 + 4x + 4y + 12 = 0$

Question Number : 22 Question Id : 47720317646 Display Question Number : Yes Is Question Mandatory : No

If the centre of the circle $x^2 + y^2 - 6x + ky + 9 = 0$ lies on the line $2x + y - 4 = 0$, then, the radius of that circle is

Options :

1. ✖ 1

2. ✔ 2

3. ✖ 3

4. ✖ 4

Question Number : 23 Question Id : 47720317647 Display Question Number : Yes Is Question Mandatory : No

Distance from the focus of the parabola $y^2 = 8x$ to the point $(2,4)$ on it is

Options :

1. ✖ 1

2. ✖ 2

3. ✖ 3

4. ✔ 4

Question Number : 24 Question Id : 47720317648 Display Question Number : Yes Is Question Mandatory : No

If e is the eccentricity and a is the length of the semi-minor axis of the ellipse $9x^2 + 4y^2 = 36$, then, $e^2 + a^2 =$

Options :

1. ✓ $\frac{41}{9}$

2. ✗ $\frac{23}{9}$

3. ✗ $\frac{17}{3}$

4. ✗ $\frac{11}{3}$

Question Number : 25 Question Id : 47720317649 Display Question Number : Yes Is Question Mandatory : No

One of the foci of the hyperbola $\frac{x^2}{9} - \frac{y^2}{16} = -1$ is

Options :

1. ✗ $(5,0)$

2. ✓ $(0,5)$

3. ✗ $(4,0)$

4. ✗ $(0,3)$

Question Number : 26 Question Id : 47720317650 Display Question Number : Yes Is Question Mandatory : No

$$\lim_{x \rightarrow 0} \frac{2^x - 1}{\sqrt{2+x} - \sqrt{2}} =$$

Options :

1. ✖ $\sqrt{2} \log 2$

2. ✖ $2 \log 2$

3. ✔ $2\sqrt{2} \log 2$

4. ✖ $\log 2$

Question Number : 27 Question Id : 47720317651 Display Question Number : Yes Is Question Mandatory : No

$$\text{If } y = \sqrt{\frac{2+x^2}{2-x^2}}, \text{ then, } \frac{dy}{dx} =$$

Options :

1. ✔ $\frac{4x}{(2-x^2)\sqrt{4-x^4}}$

2. ✖ $\frac{4x}{(2-x^2)\sqrt{4-x^2}}$

3. ✖

$$\frac{4x}{(4-x^2)\sqrt{2-x^4}}$$

4. ✖ $\frac{2x}{(2-x^2)\sqrt{4-x^4}}$

Question Number : 28 Question Id : 47720317652 Display Question Number : Yes Is Question Mandatory : No

If $2x^2 - 3xy + y^2 - 4x + 6y - 7 = 0$, then, $\frac{dy}{dx} =$

Options :

1. ✖ $\frac{-4x - 3y + 4}{3x + 2y + 6}$

2. ✔ $\frac{4x - 3y - 4}{3x - 2y - 6}$

3. ✖ $\frac{4x + 3y + 4}{3x - 2y - 6}$

4. ✖ $\frac{4x - 3y - 4}{3x + 2y - 6}$

Question Number : 29 Question Id : 47720317653 Display Question Number : Yes Is Question Mandatory : No

If the radius of a sphere is increased from 5 cm to 5.03 cm, then, the approximate relative error in its surface area is

Options :

1. ✓ 0.012

2. ✗ 0.06

3. ✗ 0.08

4. ✗ 0.1

Question Number : 30 Question Id : 47720317654 Display Question Number : Yes Is Question Mandatory : No

The equation of the normal at (1,1) to the curve $y = 2x^3 - 3x^2 + x + 1$ is

Options :

1. ✓ $x + y - 2 = 0$

2. ✗ $x - y = 0$

3. ✗ $2x - 3y + 1 = 0$

4. ✗ $x - 2y + 1 = 0$

Question Number : 31 Question Id : 47720317655 Display Question Number : Yes Is Question Mandatory : No

The angle between the curves $x^2 + y^2 = 2$ and $y^2 = x$ is

Options :

1. ✓ $\tan^{-1}(3)$

2. ✗ $\tan^{-1}(2)$

3. ✗ $\frac{\pi}{4}$

4. ✗ $\frac{\pi}{2}$

Question Number : 32 Question Id : 47720317656 Display Question Number : Yes Is Question Mandatory : No

If the volume of a cube is increasing at the rate of 5 cu. cm./sec , the rate of change in the length of the edge of the cube, when the length of the edge is 5 cm., is

Options :

1. ✗ $\frac{1}{15}$ sq. cm. /sec

2. ✗ 15 cm. /sec

3. ✓ $\frac{1}{15}$ cm. /sec

4. ✗ $\frac{1}{3}$ cm. /sec

Question Number : 33 Question Id : 47720317657 Display Question Number : Yes Is Question

Mandatory : No

The interval in which the function $f(x) = 2x^3 - 9x^2 + 12x - 6$ is strictly increasing is

Options :

1. ✖ (1,2)
2. ✖ [1,2]
3. ✖ $(-\infty, 1] \cup [2, \infty)$
4. ✔ $(-\infty, 1) \cup (2, \infty)$

Question Number : 34 Question Id : 47720317658 Display Question Number : Yes Is Question Mandatory : No

If the perimeter of a rectangle is 40 units, then the area of that rectangle is maximum when its dimensions are

Options :

1. ✖ 14, 6
2. ✖ 22, 18
3. ✔ 10, 10
4. ✖ 20, 20

Question Number : 35 Question Id : 47720317659 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ 0

2. ✖ u

3. ✔ $2\left(\frac{x+y}{x-y}\right)$

4. ✖ 2u

Question Number : 36 Question Id : 47720317660 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{x^2 + 2x - 1}{\sqrt{x^3 + 3x^2 - 3x + 6}} dx =$$

Options :

1. ✔ $\frac{2}{3}\sqrt{x^3 + 3x^2 - 3x + 6} + c$

2. ✖ $\frac{1}{3}\sqrt{x^3 + 3x^2 - 3x + 6} + c$

3. ✖ $\frac{2}{3\sqrt{x^3 + 3x^2 - 3x + 6}} + c$

$$\frac{1}{6\sqrt{x^3 + 3x^2 - 3x + 6}} + c$$

4. ✖

Question Number : 37 Question Id : 47720317661 Display Question Number : Yes Is Question Mandatory : No

$$\int e^{2x} \sec 2x (1 + \tan 2x) dx =$$

Options :

1. ✖ $e^{2x} \sec 2x + c$

2. ✖ $e^{2x} \tan 2x + c$

3. ✔ $\frac{1}{2} e^{2x} \sec 2x + c$

4. ✖ $2e^{2x} \sec 2x + c$

Question Number : 38 Question Id : 47720317662 Display Question Number : Yes Is Question Mandatory : No

$$\int \frac{dx}{\sqrt{x^2 - 2x + 5}} =$$

Options :

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

2. ✖ $\sinh^{-1}(x-1) + c$

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

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

Question Number : 39 Question Id : 47720317663 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ $8 + \log \frac{1}{3}$

2. ✔ $4 - \log 3$

3. ✖ $2 - \log 3$

4. ✖ $4 + \log 3$

Question Number : 40 Question Id : 47720317664 Display Question Number : Yes Is Question Mandatory : No

The area enclosed between the X-axis and the curve $y = (x - 2)^2 - 9$ is

Options :

1. ✖ 54

2. ✖ $\frac{320}{3}$

3. ✔ 36

4. ✖ $\frac{124}{3}$

Question Number : 41 Question Id : 47720317665 Display Question Number : Yes Is Question Mandatory : No

The volume formed when the area bounded by the parabola $y^2 = 8x$, the X-axis and the ordinates at $x = 0$ and $x = 2$ rotates about the X-axis is (in cubic units)

Options :

1. ✖ 4π

2. ✖ 8π

3. ✖ 32π

4. ✔ 16π

Question Number : 42 Question Id : 47720317666 Display Question Number : Yes Is Question

Mandatory : No

Mean value of $\frac{1}{4+x^2}$ on $[-2,2]$ is

Options :

1. ✖ $\frac{\pi}{4}$

2. ✖ $\frac{\pi}{8}$

3. ✖ $\frac{\pi}{32}$

4. ✔ $\frac{\pi}{16}$

Question Number : 43 Question Id : 47720317667 Display Question Number : Yes Is Question Mandatory : No

Root Mean Square value of $\sqrt{9 - 2x^2}$ over the range $x = 0$ to $x = 3$ is

Options :

1. ✔ $\sqrt{3}$

2. ✖ 3

3. ✖ $\sqrt{6}$

4. ✖ 9

Question Number : 44 Question Id : 47720317668 Display Question Number : Yes Is Question Mandatory : No

The differential equation of the family of curves $y = Ae^{3x} + Be^{-2x}$, where A and B are arbitrary constants, is

Options :

1. ✖ $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$

2. ✖ $\frac{d^2y}{dx^2} - \frac{dy}{dx} + 6y = 0$

3. ✖ $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = 0$

4. ✔ $\frac{d^2y}{dx^2} - \frac{dy}{dx} - 6y = 0$

Question Number : 45 Question Id : 47720317669 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ $e^x + e^y = c$

2. ✖ $e^x - e^y = c$

3. ✓ $e^{x+y} + ce^y + 1 = 0$

4. ✗ $e^{x+y} = ce^y + 1$

Question Number : 46 Question Id : 47720317670 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} - \frac{3y}{x} = \frac{2y^2}{x^2}$ is

Options :

1. ✓ $y = cx^2(x + y)$

2. ✗ $\frac{y}{x - y} = cx^2$

3. ✗ $y = cx(x + y)$

4. ✗ $y = cx(x - y)$

Question Number : 47 Question Id : 47720317671 Display Question Number : Yes Is Question Mandatory : No

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

Options :

1. ✖ $2y = xe^{2x} + 2cx^2$

2. ✔ $2y = x^2e^{2x} + 2cx^2$

3. ✖ $y = 2x^2e^{2x} + cx^2$

4. ✖ $y = x^2e^{2x} + cx$

Question Number : 48 Question Id : 47720317672 Display Question Number : Yes Is Question Mandatory : No

The general solution of the differential equation $\frac{dy}{dx} + y \cot x = y^3 \sin^2 x$ is

Options :

1. ✖ $2x^2y + \csc^2 x = cy$

2. ✖ $2xy^2 + \sin^2 x = cy^2$

3. ✔ $2xy^2 + \csc^2 x = cy^2$

4. ✖ $2xy + \csc^2 x = cy^2$

Question Number : 49 Question Id : 47720317673 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 - 3D + 2)y = e^{3x}$ is

Options :

1. ✖ $\frac{1}{20}e^{3x}$

2. ✖ $\frac{1}{16}e^{3x}$

3. ✖ $\frac{1}{3}e^{3x}$

4. ✔ $\frac{1}{2}e^{3x}$

Question Number : 50 Question Id : 47720317674 Display Question Number : Yes Is Question Mandatory : No

The particular integral of the differential equation $(D^2 + 9)y = \sin 3x$ is

Options :

1. ✔ $-\frac{x \cos 3x}{6}$

2. ✖ $\frac{x \cos 3x}{6}$

3. ✖ $-\frac{x \sin 3x}{6}$

4. ✖

$$\frac{x \sin 3x}{6}$$

Physics

Section Id :	477203348
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

Question Number : 51 Question Id : 47720317675 Display Question Number : Yes Is Question Mandatory : No

The dimension of Universal Gas Constant “R” is:

Options :

1. ✖ $[M^2 L^2 T^{-2} K^{-1}]$
2. ✖ $[M^1 L^2 T^{-2}]$
3. ✔ $[M^1 L^2 T^{-2} K^{-1}]$
4. ✖ $[M^2 L^2 T^{-2} K^0]$

Question Number : 52 Question Id : 47720317676 Display Question Number : Yes Is Question Mandatory : No

The value of Planck's constant 'h' is $6.626 \times 10^{-34} \text{ J.Hz}^{-1}$. Its value in eV is

Options :

1. ✖ 1.054×10^{-34}

2. ✔ 4.135×10^{-15}

3. ✖ 0.241×10^{15}

4. ✖ Unchanged

Question Number : 53 Question Id : 47720317677 Display Question Number : Yes Is Question Mandatory : No

A unit vector perpendicular to $A = \hat{i} + \hat{j} - \hat{k}$ and $B = 2\hat{i} - \hat{j} + 3\hat{k}$ is

Options :

1. ✖ $\hat{n} = (2\hat{i} - \hat{j} - 3\hat{k}) / \sqrt{14}$

2. ✔ $\hat{n} = (2\hat{i} - 5\hat{j} - 3\hat{k}) / \sqrt{38}$

3. ✖ $\hat{n} = (2\hat{i} - 5\hat{j} - 3\hat{k}) / \sqrt{28}$

4. ✖ $\hat{n} = (\hat{i} - \hat{j} - \hat{k}) / \sqrt{3}$

Question Number : 54 Question Id : 47720317678 Display Question Number : Yes Is Question Mandatory : No

If the two vectors **A** and **B** are such that $|\mathbf{A}-\mathbf{B}| = |\mathbf{A}+\mathbf{B}|$ then

Options :

1. ✖ $\mathbf{A} = \mathbf{B}$

2. ✖ **A** is parallel to **B**

3. ✖ $|\mathbf{B}| = 0$

4. ✔ **A** is perpendicular to **B**

Question Number : 55 Question Id : 47720317679 Display Question Number : Yes Is Question Mandatory : No

A rubber ball of mass 0.2 kg falls onto the floor. The ball hits with a speed of 8 m/s and rebounds with approximately the same speed. High speed photographs show that the ball is in contact with the floor for 10^{-3} s. Then the average force exerted on the ball by the floor is

Options :

1. ✖ 1,600 N

2. ✖ 0 N

3. ✔ 3,200 N

4. ✖ 320 N

Question Number : 56 Question Id : 47720317680 Display Question Number : Yes Is Question Mandatory : No

A projectile is fired with a speed 'u' at an angle θ with the horizontal. Find its speed when its direction of motion makes an angle α with the horizontal.

Options :

1. ✖ $u \cos(\theta) \cos(\alpha)$

2. ✖ $u \cos(\theta)$

3. ✖ $u \cos(\alpha)$

4. ✔ $u \cos(\theta) \sec(\alpha)$

Question Number : 57 Question Id : 47720317681 Display Question Number : Yes Is Question Mandatory : No

A person travelling on a straight line moves with a uniform velocity ' v_1 ' for a distance ' x ' and with a uniform velocity ' v_2 ' for the next equal distance. The average velocity ' v ' is given by

Options :

1. ✖ $v = \frac{v_1 + v_2}{2}$

2. ✖ $v = \sqrt{v_1 v_2}$

3. ✔ $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

4. ✖ $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

Question Number : 58 Question Id : 47720317682 Display Question Number : Yes Is Question Mandatory : No

A ball is dropped from a height ' H '. If it takes 0.2 sec to cross the last 6.0 m before hitting the ground, the value of height ' H ' from which it was dropped is

Options :

1. ✔ 48 m

2. ✖ 42 m

3. ✖ 12 m

4. ✖ 30 m

Question Number : 59 Question Id : 47720317683 Display Question Number : Yes Is Question Mandatory : No

Mark the correct statement about the frictional force 'f' when a body slides across a surface with coefficient of friction μ .

Options :

1. ✖ The magnitude of 'f' is less than μN

2. ✔ 'f' is independent of the area of contact

3. ✖ 'f' depends on the area of contact

4. ✖ 'f' is directly proportional to the instantaneous velocity of the body

Question Number : 60 Question Id : 47720317684 Display Question Number : Yes Is Question Mandatory : No

A body starts slipping down an incline and moves half meter in half second. How long will it take to move the next half meter?

Options :

1. ✔ 0.2 sec

2. ✖ 0.5 sec

3. ✖ 1.0 sec

4. ✖ 0.1 sec

Question Number : 61 Question Id : 47720317685 Display Question Number : Yes Is Question Mandatory : No

The energy needed to eject a 50kg spacecraft from the surface of the earth is (radius of the earth is 6.4×10^6 m)

Options :

1. ✖ 1.1×10^4 J

2. ✖ 1.1×10^9 J

3. ✖ 3.13×10^4 J

4. ✔ 3.13×10^9 J

Question Number : 62 Question Id : 47720317686 Display Question Number : Yes Is Question Mandatory : No

A particle of mass 'm' moves in one dimension along the positive x-axis. It is acted on by a constant force directed towards the origin with magnitude 'B', and an inverse square law repulsive force with magnitude (A/x^2) away from the origin. The equilibrium position x_0 of the mass is at

Options :

1. ✖ $x_0=0$

2. ✔ $x_0=(A/B)^{1/2}$

3. ✖ $x_0 = (A/B)$

4. ✖ $x_0 = (B/A)^{1/2}$

Question Number : 63 Question Id : 47720317687 Display Question Number : Yes Is Question Mandatory : No

Ocean thermal energy is due to

Options :

1. ✖ Energy stored by waves in the ocean

2. ✖ Tides arising out in the ocean

3. ✖ Pressure difference at different levels in the ocean

4. ✔ Temperature difference at different levels in the ocean

Question Number : 64 Question Id : 47720317688 Display Question Number : Yes Is Question Mandatory : No

Consider the wave $y = (10 \text{ mm}) \sin[(2 \text{ cm}^{-1})x - (60 \text{ s}^{-1})t]$. The time period of this wave is

Options :

1. ✔ $\frac{\pi}{30} \text{ sec}$

2. ✖ $\frac{30}{\pi} \text{ sec}$

3. ✖ $\frac{\pi}{60} \text{ sec}$

4. ✖ $\frac{\pi}{120} \text{sec}$

Question Number : 65 Question Id : 47720317689 Display Question Number : Yes Is Question Mandatory : No

If the speed of sound at 0°C is 332ms^{-1} , then the atmospheric temperature of a day when sound travels 336 m in one second is

Options :

1. ✖ 4°C

2. ✖ 20°C

3. ✖ 17°C

4. ✔ 7°C

Question Number : 66 Question Id : 47720317690 Display Question Number : Yes Is Question Mandatory : No

A sound source vibrates with a frequency of 1.0 kHz. Two sound waves, originating from this source, travel along different paths in air, where one path is 166 cm longer than other and then meet at a point. Then what will be the nature of interference? The speed of sound in air is 332 ms^{-1} .

Options :

1. ✔ It will be a constructive interference

2. ✖ It will be a destructive interference

3. ✖ Provided information is insufficient to say about nature of interference

4. ✖ It will depend on the type of source

Question Number : 67 Question Id : 47720317691 Display Question Number : Yes Is Question

Mandatory : No

A simple pendulum is taken to a place in space where its distance from the surface of the earth is equal to the radius of the earth. What will be the time period of small oscillations of the pendulum if the length of the string is 1.0 m. Take $g = \pi^2 \text{ m/s}^2$ at the surface of the earth.

Options :

1. ✖ 2 sec

2. ✔ 4 sec

3. ✖ $\frac{1}{\pi}$ sec

4. ✖ 2π sec

Question Number : 68 Question Id : 47720317692 Display Question Number : Yes Is Question

Mandatory : No

The motion of a block of mass 'm' is restricted on x-axis by attaching two identical springs of spring constant 'k' on its opposite sides. The other ends of the springs are fixed on walls. When the mass is displaced from its equilibrium position on either side, it executes a simple harmonic motion. The period of oscillations for this oscillation is

Options :

1. ✖ $2\pi\sqrt{\frac{m}{k}}$

2. ✖ $2\pi\sqrt{\frac{k}{m}}$

3. ✖ $2\pi\sqrt{\frac{2k}{m}}$

4. ✔ $2\pi\sqrt{\frac{m}{2k}}$

Question Number : 69 Question Id : 47720317693 Display Question Number : Yes Is Question Mandatory : No

Is it always true that $dU = C_v dT$?

Options :

1. ✖ Yes.

2. ✖ No, it is never true

3. ✔ It is true only for ideal gas

4. ✖ It is true only for non-ideal gas

Question Number : 70 Question Id : 47720317694 Display Question Number : Yes Is Question Mandatory : No

One mole of ideal monatomic gas is confined in a cylinder by a piston and is maintained at a constant temperature T_0 by thermal contact with a heat reservoir. The gas slowly expands from V_1 to V_2 while being held at the same temperature T_0 . The change in internal energy of the gas is

Options :

1. ✖ $RT_0 \ln(V_2/V_1)$

2. ✓ zero

3. ✗ RT_0

4. ✗ $RT_0 \ln(V_1/V_2)$

Question Number : 71 Question Id : 47720317695 Display Question Number : Yes Is Question Mandatory : No

A pan filled with hot food cools from 94 °C to 86 °C in 2 minutes when the room temperature is at 20 °C. How long will it take to cool from 71 °C to 69 °C?

Options :

1. ✓ 0.7 min

2. ✗ 0.5 min

3. ✗ 0.4 min

4. ✗ 2 min.

Question Number : 72 Question Id : 47720317696 Display Question Number : Yes Is Question Mandatory : No

In an adiabatic expansion of an ideal gas

Options :

1. ✗ $PV = \text{constant}$

2. ✗ $PV^{\gamma-1} = \text{constant}$

3. ✖ $TV^\gamma = \text{constant}$

4. ✔ $P^{1-\gamma}T^\gamma = \text{constant}$

Question Number : 73 Question Id : 47720317697 Display Question Number : Yes Is Question Mandatory : No

The rms speed of a nitrogen (N_2) molecule at 300K is (One mole of N_2 has a mass of 28 g and $k_B = 1.38 \times 10^{-23} \text{ JK}^{-1}$)

Options :

1. ✖ 450 ms^{-1}

2. ✖ 123 ms^{-1}

3. ✔ 517 ms^{-1}

4. ✖ 230 ms^{-1}

Question Number : 74 Question Id : 47720317698 Display Question Number : Yes Is Question Mandatory : No

Which of the following are not the properties of superconductors?

Options :

1. ✖ They possess infinite conductivity

2. ✖ They possess zero resistivity

3. ✔ They are ferromagnetic in nature

4. ✖ They are diamagnetic in nature

Question Number : 75 Question Id : 47720317699 Display Question Number : Yes Is Question

Mandatory : No

The minimum energy required for a photoelectron to escape from a metal plate in a photocell is called

Options :

1. ✖ Planck's constant

2. ✔ Work function

3. ✖ Threshold energy

4. ✖ Stopping voltage

Chemistry

Section Id :	477203349
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 : 47720317700 Display Question Number : Yes Is Question

Mandatory : No

Which of the following is not a fundamental particle?

Options :

1. ✖ Electron
2. ✖ Proton
3. ✔ Alpha particle
4. ✖ Neutron

Question Number : 77 Question Id : 47720317701 Display Question Number : Yes Is Question Mandatory : No

A given orbital labelled by the magnetic quantum number, $m=-1$. This cannot be

Options :

1. ✔ s-orbital
2. ✖ p-orbital
3. ✖ d-orbital
4. ✖ f-orbital

Question Number : 78 Question Id : 47720317702 Display Question Number : Yes Is Question Mandatory : No

Maximum number of electrons that may be present in one 4f-orbital is

Options :

1. ✓ 2

2. ✗ 4

3. ✗ 7

4. ✗ 14

Question Number : 79 Question Id : 47720317703 Display Question Number : Yes Is Question Mandatory : No

Which of the following is favourable condition for the formation of ionic bond?

Options :

1. ✗ Small cation with small charge

2. ✗ Small anion with large charge

3. ✓ Large difference in the electronegativity

4. ✗ Small cation with large charge

Question Number : 80 Question Id : 47720317704 Display Question Number : Yes Is Question Mandatory : No

The covalency of nitrogen in HNO_2 is

Options :

1. ✖ 0

2. ✖ 2

3. ✔ 3

4. ✖ 5

Question Number : 81 Question Id : 47720317705 Display Question Number : Yes Is Question Mandatory : No

The normality of 0.98%(w/v) H_2SO_4 solution is

Options :

1. ✖ 0.1N

2. ✔ 0.2N

3. ✖ 0.4N

4. ✖ 1 N

Question Number : 82 Question Id : 47720317706 Display Question Number : Yes Is Question Mandatory : No

The equivalent weight of CuSO_4 when it is converted to Cu_2I_2 (M= Mol.wt)

Options :

1. ✔

M/1

2. ✖ M/2

3. ✖ M/3

4. ✖ 2M

Question Number : 83 Question Id : 47720317707 Display Question Number : Yes Is Question Mandatory : No

Which of the following is centi-normal solution ?

Options :

1. ✖ 1 N

2. ✖ N/10

3. ✖ N/20

4. ✔ N/100

Question Number : 84 Question Id : 47720317708 Display Question Number : Yes Is Question Mandatory : No

The unit for ionic product of water is

Options :

1. ✖ Mole/kg

2. ✖ Mole·kg

3. ✔ $\text{Mole}^2\text{lit}^{-2}$

4. ✖ $\text{Mole}^2\text{lit}^2$

Question Number : 85 Question Id : 47720317709 Display Question Number : Yes Is Question Mandatory : No

Which of the following is relatively strong Lewis acid?

Options :

1. ✖ BF_3

2. ✖ BCl_3

3. ✖ BBr_3

4. ✔ BI_3

Question Number : 86 Question Id : 47720317710 Display Question Number : Yes Is Question Mandatory : No

The decrease in electrical conductivity of metals with increase in temperature is due to increase in

Options :

1. ✖ the velocity of electrons

- 2. ✓ the resistance of the metal
- 3. ✗ the number of electrons
- 4. ✗ the number of metal atoms

Question Number : 87 Question Id : 47720317711 Display Question Number : Yes Is Question Mandatory : No

In the electrolytic cell, flow of electrons is from:

Options :

- 1. ✗ Cathode to anode in the solution
- 2. ✗ Cathode to anode through external circuit
- 3. ✓ Anode to cathode through external circuit
- 4. ✗ Anode to cathode in the solution

Question Number : 88 Question Id : 47720317712 Display Question Number : Yes Is Question Mandatory : No

The product of electrolysis of aqueous NaCl solution are

Options :

- 1. ✗ Na at cathode and Cl_2 at anode

2. ✓ H_2 at cathode and Cl_2 at anode
3. ✗ H_2 at cathode and O_2 at anode
4. ✗ Na at cathode and O_2 at anode

Question Number : 89 Question Id : 47720317713 Display Question Number : Yes Is Question Mandatory : No

When zinc piece is kept in CuSO_4 solution, copper get precipitated because

Options :

1. ✗ Standard reduction potential of zinc is more than copper
2. ✓ Standard reduction potential of zinc is less than copper
3. ✗ Atomic number of zinc is larger than copper
4. ✗ Atomic number of zinc is lower than copper

Question Number : 90 Question Id : 47720317714 Display Question Number : Yes Is Question Mandatory : No

Hardness of water is expressed in terms of ----- equivalents.

Options :

1. ✓ CaCO_3

2. ✖ MgCO_3

3. ✖ Na_2CO_3

4. ✖ K_2CO_3

Question Number : 91 Question Id : 47720317715 Display Question Number : Yes Is Question Mandatory : No

Anion exchange resin is regenerated by using

Options :

1. ✖ dil NaCl

2. ✖ dil HCl

3. ✔ dil NaOH

4. ✖ dil KCl

Question Number : 92 Question Id : 47720317716 Display Question Number : Yes Is Question Mandatory : No

Which of the following is responsible for temporary hardness?

Options :

1. ✖ MgCl_2

2. ✖ CaSO_4

3. ✖ MgSO_4

4. ✔ $\text{Mg}(\text{HCO}_3)_2$

Question Number : 93 Question Id : 47720317717 Display Question Number : Yes Is Question Mandatory : No

Corrosion is an example of -----

Options :

1. ✔ Oxidation

2. ✖ Reduction

3. ✖ Electrolysis

4. ✖ Hydrolysis

Question Number : 94 Question Id : 47720317718 Display Question Number : Yes Is Question Mandatory : No

In electrochemical corrosion, if the formed corrosion product is insoluble in the medium then the corrosion rate further -----

Options :

1. ✖ Increases

2. ✔ Decreases

3. ✖ Partially increases

4. ✖ No change

Question Number : 95 Question Id : 47720317719 Display Question Number : Yes Is Question Mandatory : No

Which of the following is an example of co-polymer ?

Options :

1. ✖ PVC

2. ✖ Teflon

3. ✖ Polythene

4. ✔ Buna-S rubber

Question Number : 96 Question Id : 47720317720 Display Question Number : Yes Is Question Mandatory : No

Which of the following polymer contains nitrogen atoms ?

Options :

1. ✖ PVC

2. ✖ Bakelite

3. ✔ Nylon

4. ✖ Teflon

Question Number : 97 Question Id : 47720317721 Display Question Number : Yes Is Question Mandatory : No

Isoprene is monomer of

Options :

1. ✖ Teflon

2. ✖ Nylon

3. ✔ Natural rubber

4. ✖ PVC

Question Number : 98 Question Id : 47720317722 Display Question Number : Yes Is Question Mandatory : No

The only liquid fuel in nature is

Options :

1. ✖ Kerosene

2. ✖ Diesel

3. ✖ Petrol

4. ✔ Petroleum

Question Number : 99 Question Id : 47720317723 Display Question Number : Yes Is Question Mandatory : No

The medium which reacts with pollutant is called

Options :

1. ✓ Sink
2. ✗ Receptor
3. ✗ Speciation
4. ✗ Contaminant

Question Number : 100 Question Id : 47720317724 Display Question Number : Yes Is Question Mandatory : No

Which of the following is used in the estimation of Chemical Oxygen Demand (COD) ?

Options :

1. ✗ Methyl orange
2. ✓ $\text{K}_2\text{Cr}_2\text{O}_7 + 50\% \text{H}_2\text{SO}_4$
3. ✗ $\text{CaOCl}_2 + 50\% \text{H}_2\text{SO}_4$
4. ✗ Alum + CaO

Agricultural Engineering

Section Id :	477203350
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 : 47720317725 Display Question Number : Yes Is Question Mandatory : No

Type of chisels useful for cutting oil grooves and channels in bearings are

Options :

1. ✘ Flat
2. ✘ Cross-cut
3. ✔ Round nose
4. ✘ Diamond point

Question Number : 102 Question Id : 47720317726 Display Question Number : Yes Is Question Mandatory : No

Making a cut part away across a strip of metal sheet is

Options :

1. ✘ Notching

2. ✖ Slitting

3. ✔ Lancing

4. ✖ Nibbing

Question Number : 103 Question Id : 47720317727 Display Question Number : Yes Is Question Mandatory : No

Soft brush used for moistening the sand around the pattern is

Options :

1. ✖ Riddle

2. ✖ Bellow

3. ✔ Swab

4. ✖ Rapper

Question Number : 104 Question Id : 47720317728 Display Question Number : Yes Is Question Mandatory : No

Enlarging of holes is called as

Options :

1. ✖ Drilling

- 2. ✓ Boring
- 3. ✗ Reaming
- 4. ✗ Counter boring

Question Number : 105 Question Id : 47720317729 Display Question Number : Yes Is Question Mandatory : No

Lathe headstock spindle is made of

Options :

- 1. ✗ Carbon
- 2. ✗ Nickel-chrome steel
- 3. ✗ Cast iron
- 4. ✓ Carbon and nickel-chrome steel

Question Number : 106 Question Id : 47720317730 Display Question Number : Yes Is Question Mandatory : No

Height of an oil column of specific gravity 0.8 which cause a pressure of 25 kPa is

Options :

- 1. ✗ 2.5 m

2. ✖ 3.125 m

3. ✖ 2.0 m

4. ✔ 3.2 m

Question Number : 107 Question Id : 47720317731 Display Question Number : Yes Is Question Mandatory : No

Centre of pressure of 3 m^2 circular gate its centre placed 4 m below under water level and having 2 m^4 moment of inertia is

Options :

1. ✖ 4.0 m

2. ✔ 4.3 m

3. ✖ 5.0 m

4. ✖ 5.3 m

Question Number : 108 Question Id : 47720317732 Display Question Number : Yes Is Question Mandatory : No

For frictionless flow, head loss is equal to

Options :

1. ✖ 3 m

2. ✖ 2 m

3. ✖ 1 m

4. ✔ 0 m

Question Number : 109 Question Id : 47720317733 Display Question Number : Yes Is Question Mandatory : No

Time of emptying completely from 10 m × 6 m tank having water depth of 1.25 m through 0.23 m² bottom orifice, if $C_d = 0.62$, is

Options :

1. ✖ 112 s

2. ✔ 212 s

3. ✖ 312 s

4. ✖ 412 s

Question Number : 110 Question Id : 47720317734 Display Question Number : Yes Is Question Mandatory : No

Bazin's constant for discharge of rectangular weir for head of 600 mm is

Options :

1. ✖ 0.35

2. ✔ 0.41

3. ✖ 0.47

4. ✖ 0.53

Question Number : 111 Question Id : 47720317735 Display Question Number : Yes Is Question Mandatory : No

Critical depth for $4 \text{ m}^2/\text{s}$ discharge/unit width is

Options :

1. ✖ 0.74 m

2. ✔ 1.18 m

3. ✖ 1.63 m

4. ✖ 5.39 m

Question Number : 112 Question Id : 47720317736 Display Question Number : Yes Is Question Mandatory : No

Temperature produced in a power stroke of an engine is about

Options :

1. ✖ 1.6°C

2. ✖ 16°C

3. ✖ 160 °C

4. ✔ 1600 °C

Question Number : 113 Question Id : 47720317737 Display Question Number : Yes Is Question Mandatory : No

Temperature at which fuel is cooled to calculate the higher calorific value is

Options :

1. ✔ 15 °C

2. ✖ 35 °C

3. ✖ 65 °C

4. ✖ 75 °C

Question Number : 114 Question Id : 47720317738 Display Question Number : Yes Is Question Mandatory : No

Which law states that total pressure of the mixture of gases is equal to the sum of the partial pressure of the individual gases in the mixture?

Options :

1. ✖ Charles law

2. ✔ Dulong's formula

3. ✖ Clausius law

4. ✖ Avogadro's law

Question Number : 115 Question Id : 47720317739 Display Question Number : Yes Is Question Mandatory : No

Storage battery of tractor –ve plates are made of

Options :

1. ✖ Lead

2. ✖ Antimony

3. ✔ Spongy lead

4. ✖ Lead and antimony

Question Number : 116 Question Id : 47720317740 Display Question Number : Yes Is Question Mandatory : No

Speed variation of good governor at full loaded and no-load conditions is about

Options :

1. ✖ 500 rpm

2. ✖ 200 rpm

3. ✔ 100 rpm

4. ✖ 150 rpm

Question Number : 117 Question Id : 47720317741 Display Question Number : Yes Is Question Mandatory : No

If whole circle bearing of a line is $68^{\circ}32'$, it's quadrantal bearing is

Options :

1. ✔ N. $68^{\circ}32'$ E.

2. ✖ S. $68^{\circ}32'$ E.

3. ✖ N. $68^{\circ}32'$ W.

4. ✖ E. $68^{\circ}32'$ W.

Question Number : 118 Question Id : 47720317742 Display Question Number : Yes Is Question Mandatory : No

Sum of interior angles of a pentagon is equal to

Options :

1. ✖ 180°

2. ✖ 360°

3. ✔ 540°

4. ✖ 720°

Question Number : 119 Question Id : 47720317743 Display Question Number : Yes Is Question Mandatory : No

In a prismatic compass, the graduations start from zero marked at the

Options :

1. ✖ East end of the needle

2. ✔ South end of the needle

3. ✖ North end of the needle

4. ✖ West end of the needle

Question Number : 120 Question Id : 47720317744 Display Question Number : Yes Is Question Mandatory : No

Lines connecting points whose declination is zero are known as

Options :

1. ✖ Isogonic lines

2. ✔ Agonic lines

3. ✖ Isogonic charts

4. ✖ Grid lines

Question Number : 121 Question Id : 47720317745 Display Question Number : Yes Is Question Mandatory : No

What method of traversing is employed in locating the visible but distant and inaccessible points?

Options :

1. ✔ Intersection

2. ✖ Radiation

3. ✖ Traverse

4. ✖ Distancing

Question Number : 122 Question Id : 47720317746 Display Question Number : Yes Is Question Mandatory : No

Two verniers of theodolite have indexes spaced

Options :

1. ✔ 180° apart

2. ✖ 270° apart

3. ✖ 360° apart

4. ✖ 90° apart

Question Number : 123 Question Id : 47720317747 Display Question Number : Yes Is Question Mandatory : No

Type of compass provided in all modern theodolites is

Options :

- 1. ✔ Tubular
- 2. ✖ T-shaped
- 3. ✖ Screw
- 4. ✖ V-shaped

Question Number : 124 Question Id : 47720317748 Display Question Number : Yes Is Question Mandatory : No

Indirect method of contouring followed when the area is not very extensive is

Options :

- 1. ✔ Squares
- 2. ✖ Cross-section
- 3. ✖ Radial lines

4. ✖ Straight lines

Question Number : 125 Question Id : 47720317749 Display Question Number : Yes Is Question Mandatory : No

Lens fitted to tacheometer is

Options :

1. ✖ Convex

2. ✖ Concave

3. ✖ Prism

4. ✔ Anallactic

Question Number : 126 Question Id : 47720317750 Display Question Number : Yes Is Question Mandatory : No

Rays that distomats use to measure distance are

Options :

1. ✖ Visible

2. ✖ UV

3. ✔ IR

4. ✖ Radio waves

Question Number : 127 Question Id : 47720317751 Display Question Number : Yes Is Question Mandatory : No

Physical property that is applied in the design of oscillating conveyors, threshers, etc. is

Options :

1. ✖ Terminal velocity

2. ✖ Angle of repose

3. ✖ Plane of rupture

4. ✔ Frictional property

Question Number : 128 Question Id : 47720317752 Display Question Number : Yes Is Question Mandatory : No

Generally, it has been observed that at very low speeds of sliding, with speed, coefficient of kinetic friction

Options :

1. ✔ Increases

2. ✖ Decreases

3. ✖ Independent

Neither increases nor decreases

4. ✖

Question Number : 129 Question Id : 47720317753 Display Question Number : Yes Is Question Mandatory : No

Property of material that is important in separation of chaff from wheat using air stream

Options :

Frictional Drag

1. ✖

Density

2. ✖

Terminal velocity

3. ✔

Profile drag

4. ✖

Question Number : 130 Question Id : 47720317754 Display Question Number : Yes Is Question Mandatory : No

If particle size is less than 4 mesh, suitable screens are

Options :

Grizzlies

1. ✖

Shaking screens

2. ✖

Vibrating screens

3. ✖

4. ✔

Oscillating screens

Question Number : 131 Question Id : 47720317755 Display Question Number : Yes Is Question Mandatory : No

Sticky materials can be conveyed by

Options :

1. ✖ Belt conveyor
2. ✔ Screw conveyor
3. ✖ Bucket elevator
4. ✖ Chain conveyor

Question Number : 132 Question Id : 47720317756 Display Question Number : Yes Is Question Mandatory : No

Screen interval of ASTM Standard screens is

Options :

1. ✖ 2
2. ✖ $2^{1/2}$
3. ✔ $2^{1/4}$

4. ✖ $2^{1/8}$

Question Number : 133 Question Id : 47720317757 Display Question Number : Yes Is Question Mandatory : No

Average size of particles $\overline{D_p}$ in mm, in terms of fineness modulus, FM , is given by the equation

Options :

1. ✖ $\sqrt{2^{FM}}$

2. ✖ 0.135^{FM}

3. ✖ 1.366^{FM}

4. ✔ $0.135(1.366)^{FM}$

Question Number : 134 Question Id : 47720317758 Display Question Number : Yes Is Question Mandatory : No

Jaw crushers make an angle of

Options :

1. ✖ $10^\circ-20^\circ$

2. ✔ $20^\circ-30^\circ$

3. ✖ $30^\circ-40^\circ$

4. ✖ 40°-50°

Question Number : 135 Question Id : 47720317759 Display Question Number : Yes Is Question Mandatory : No

Empirical constant, s , of filter cake compressibility is

Options :

1. ✔ 0.1-0.8

2. ✖ 0.8-1.6

3. ✖ 1.6-2.4

4. ✖ 2.4-3.2

Question Number : 136 Question Id : 47720317760 Display Question Number : Yes Is Question Mandatory : No

Extra portion of material above the horizontal level in a troughed belt V-conveyor is called as

Options :

1. ✖ Super charge

2. ✔ Surcharge

3. ✖ Sub-charge

4. ✖ Trough charge

Question Number : 137 Question Id : 47720317761 Display Question Number : Yes Is Question Mandatory : No

In rubber roll Sheller, speed ratio between the fast and slow rollers may be lie between

Options :

1. ✖ 0.75:1 and 1:0.80

2. ✔ 1:0.75 and 1:0.80

3. ✖ 1:0.50 and 1:0.80

4. ✖ 0.5:1 and 0.80:1

Question Number : 138 Question Id : 47720317762 Display Question Number : Yes Is Question Mandatory : No

After pre-treatment (pulse with oil), pulses are kept on the floor for oil diffusion about

Options :

1. ✖ 6 h

2. ✖ 8 h

3. ✔ 12 h

4. ✖ 16 h

Question Number : 139 Question Id : 47720317763 Display Question Number : Yes Is Question Mandatory : No

In comparison to raw rice bran, parboiled bran contains

Options :

1. ✓ Less starch and more oil
2. ✗ More starch and less oil
3. ✗ More starch and more oil
4. ✗ Less starch and less oil

Question Number : 140 Question Id : 47720317764 Display Question Number : Yes Is Question Mandatory : No

Angular velocity of under runner disc varies from

Options :

1. ✓ 11-13 m/s
2. ✗ 11-17 m/s
3. ✗ 21-26 m/s
4. ✗ 7-11 m/s

Question Number : 141 Question Id : 47720317765 Display Question Number : Yes Is Question Mandatory : No

Optimum moisture content (wet basis) for paddy harvesting is

Options :

1. ✖ 12-15%

2. ✖ 15-18%

3. ✖ 18-20%

4. ✔ 20-22%

Question Number : 142 Question Id : 47720317766 Display Question Number : Yes Is Question Mandatory : No

Type of soil having the low erosion problem is

Options :

1. ✔ Sandy

2. ✖ Loamy

3. ✖ Clay

4. ✖ Red loamy

Question Number : 143 Question Id : 47720317767 Display Question Number : Yes Is Question

Mandatory : No

Contour trenching is followed when land slope exceeds

Options :

1. ✖ 16%

2. ✖ 25%

3. ✔ 33%

4. ✖ 40%

Question Number : 144 Question Id : 47720317768 Display Question Number : Yes Is Question

Mandatory : No

Staggered trenches have length of

Options :

1. ✔ 3-4 m

2. ✖ 4-5 m

3. ✖ 5-6 m

4. ✖ 6-7 m

Question Number : 145 Question Id : 47720317769 Display Question Number : Yes Is Question

Mandatory : No

An example of artificial vegetation is

Options :

1. ✖ Shrubs
2. ✖ Brushwood dam
3. ✔ Sod flume
4. ✖ Agave plantation

Question Number : 146 Question Id : 47720317770 Display Question Number : Yes Is Question Mandatory : No

Rational formula predicts

Options :

1. ✔ Peak rate of runoff
2. ✖ Rainfall excess
3. ✖ Direct runoff
4. ✖ Infiltration

Question Number : 147 Question Id : 47720317771 Display Question Number : Yes Is Question Mandatory : No

Two primary tillage equipment are

Options :

1. ✖ Mould board plough and disc harrow
2. ✖ Disc plough and disc harrow
3. ✖ Disc harrow and cultivator
4. ✔ Mould board plough and sub-soiler

Question Number : 148 Question Id : 47720317772 Display Question Number : Yes Is Question Mandatory : No

Tilt angle in a disc plough varies from

Options :

1. ✖ 5° to 10°
2. ✖ 10° to 15°
3. ✔ 15° to 2°
4. ✖ 25° to 30°

Question Number : 149 Question Id : 47720317773 Display Question Number : Yes Is Question

Mandatory : No

Maximum clearance under the landside and horizontal surface when M.B. plough is resting on ground surface is

Options :

1. ✖ Throat clearance
2. ✖ Horizontal suction
3. ✔ Vertical suction
4. ✖ Vertical clevis

Question Number : 150 Question Id : 47720317774 Display Question Number : Yes Is Question Mandatory : No

A strip of unploughed land that left at each end of the field for tractor turning is

Options :

1. ✖ Gathering
2. ✖ Casting
3. ✔ Head land
4. ✖ Crown

Question Number : 151 Question Id : 47720317775 Display Question Number : Yes Is Question Mandatory : No

Concavity of 60 cm diameter disc of disc plough is about

Options :

1. ✓ 8 cm
2. ✗ 5 cm
3. ✗ 10 cm
4. ✗ 15 cm

Question Number : 152 Question Id : 47720317776 Display Question Number : Yes Is Question Mandatory : No

Evaporative cooling systems for greenhouses are developed to reduce the problem of

Options :

1. ✓ Excess heat
2. ✗ Excess cool
3. ✗ Excess heat and cool
4. ✗ Relative humidity

Question Number : 153 Question Id : 47720317777 Display Question Number : Yes Is Question Mandatory : No

Different structural designs of greenhouse based on the types of

Options :

1. ✖ Structure
2. ✔ Frames
3. ✖ Glass
4. ✖ Plastic film

Question Number : 154 Question Id : 47720317778 Display Question Number : Yes Is Question Mandatory : No

In general, the percentage of carbon dioxide in the atmosphere is

Options :

1. ✔ 345 ppm
2. ✖ 350 ppm
3. ✖ 435 ppm
4. ✖ 360 ppm

Question Number : 155 Question Id : 47720317779 Display Question Number : Yes Is Question Mandatory : No

Light transmission of Tefzel T² film is

Options :

1. ✖ 80%
2. ✖ 85%
3. ✖ 90%
4. ✔ 95%

Question Number : 156 Question Id : 47720317780 Display Question Number : Yes Is Question Mandatory : No

Greenhouse is placed against the side of an existing building is

Options :

1. ✔ Lean-to type
2. ✖ Even span type
3. ✖ Saw tooth type
4. ✖ Quonset type

Question Number : 157 Question Id : 47720317781 Display Question Number : Yes Is Question Mandatory : No

Type of equipment used to spray in orchard crops is

Options :

1. ✖ Rocker sprayer
2. ✔ Foot sprayer
3. ✖ Hydraulic sprayer
4. ✖ Knapsack sprayer

Question Number : 158 Question Id : 47720317782 Display Question Number : Yes Is Question Mandatory : No

Hollow cone nozzles are operated at

Options :

1. ✔ 0.25-1.0 MPa
2. ✖ 1.0-1.25 MPa
3. ✖ 1.25-1.5 MPa
4. ✖ 1.5-1.75 MPa

Question Number : 159 Question Id : 47720317783 Display Question Number : Yes Is Question Mandatory : No

In a cotton picker with drum type spindle arrangement, for machine's forward speed of 4.3 km/h the picking time is

Options :

1. ✖ 0.1 s

2. ✔ 0.2 s

3. ✖ 0.3 s

4. ✖ 0.4 s

Question Number : 160 Question Id : 47720317784 Display Question Number : Yes Is Question Mandatory : No

Mechanical cotton picker having the harvesting speed (m/s)

Options :

1. ✔ 1.1 to 1.6

2. ✖ 2 to 2.5

3. ✖ 3 to 4

4. ✖ 1.8 to 2.7

Question Number : 161 Question Id : 47720317785 Display Question Number : Yes Is Question Mandatory : No

In hold and twist type harvesting the jaws are made of

Options :

1. ✖ 13 gauge MS sheet
2. ✖ 12 gauge MS sheet
3. ✖ 15 gauge MS sheet
4. ✔ 14 gauge MS sheet

Question Number : 162 Question Id : 47720317786 Display Question Number : Yes Is Question Mandatory : No

n-type semi-conductor is formed when silicon is doped with

Options :

1. ✔ Phosphorous
2. ✖ Aluminium
3. ✖ Gallium
4. ✖ Boron

Question Number : 163 Question Id : 47720317787 Display Question Number : Yes Is Question Mandatory : No

Savonius rotor type wind mill is of

Options :

1. ✓ Vertical axis
2. ✗ Horizontal axis
3. ✗ Both vertical and horizontal
4. ✗ Angular

Question Number : 164 Question Id : 47720317788 Display Question Number : Yes Is Question Mandatory : No

Minimum average wind speed at which wind energy conversion system works is about

Options :

1. ✓ 3.5-4.5 m/s
2. ✗ 4.5-5.5 m/s
3. ✗ 2.5-3.5 m/s
4. ✗ 5.5-6.5 m/s

Question Number : 165 Question Id : 47720317789 Display Question Number : Yes Is Question Mandatory : No

Device in which stored chemical energy is converted directly into electrical energy is

Options :

1. ✖ Solar cell
2. ✖ Collector
3. ✔ Fuel cell
4. ✖ Solar still

Question Number : 166 Question Id : 47720317790 Display Question Number : Yes Is Question Mandatory : No

Actual value of solar constant slightly deviates with a range nearly due to slightly elliptical orbit of the earth around the sun is

Options :

1. ✖ ± 5
2. ✖ ± 4
3. ✔ ± 3
4. ✖ ± 2

Question Number : 167 Question Id : 47720317791 Display Question Number : Yes Is Question Mandatory : No

Most common method of irrigation in India is

Options :

1. ✖ Furrow
2. ✔ Border
3. ✖ Check basin
4. ✖ Micro irrigation

Question Number : 168 Question Id : 47720317792 Display Question Number : Yes Is Question Mandatory : No

Side slopes of open ditches to be recommended for clay soils

Options :

1. ✖ 4:1
2. ✖ 3:1
3. ✖ 2:1
4. ✔ 1:1

Question Number : 169 Question Id : 47720317793 Display Question Number : Yes Is Question Mandatory : No

Tile drains are usually placed below

Options :

1. ✖ Water table
2. ✔ Root zone of crops
3. ✖ Impervious layer
4. ✖ Soil surface

Question Number : 170 Question Id : 47720317794 Display Question Number : Yes Is Question Mandatory : No

If the discharge of drainage channel is 1000 Lps and area is 360 ha, the drainage coefficient is

Options :

1. ✖ 0.2 cm
2. ✔ 2.4 cm
3. ✖ 24 cm
4. ✖ 2.4 m

Question Number : 171 Question Id : 47720317795 Display Question Number : Yes Is Question

Mandatory : No

Hydraulic conductivity of soils at water logging condition is less than

Options :

1. ✓ 2.5 cm/day

2. ✗ 3.5 cm/day

3. ✗ 4 cm/day

4. ✗ 5 cm/day

Question Number : 172 Question Id : 47720317796 Display Question Number : Yes Is Question

Mandatory : No

Strength of cement-concrete mostly depends on

Options :

1. ✗ Quality of sand

2. ✗ Quality of cement

3. ✓ Water-cement ratio

4. ✗ Cement-sand ratio

Question Number : 173 Question Id : 47720317797 Display Question Number : Yes Is Question

Mandatory : No

In hill regions, one rain gauge is recommended for an area of

Options :

1. ✖ 520 km²

2. ✖ 260 km²

3. ✔ 130 km²

4. ✖ 65 km²

Question Number : 174 Question Id : 47720317798 Display Question Number : Yes Is Question

Mandatory : No

Hydrograph separation is done for estimation of

Options :

1. ✔ Direct runoff

2. ✖ Rainfall intensity

3. ✖ Rainfall depth

4. ✖ Total runoff

Question Number : 175 Question Id : 47720317799 Display Question Number : Yes Is Question

Mandatory : No

Lysimeter is used to measure

Options :

1. ✖ Infiltration
2. ✖ Evaporation
3. ✔ Evapotranspiration
4. ✖ Vapor pressure

Question Number : 176 Question Id : 47720317800 Display Question Number : Yes Is Question Mandatory : No

Area under a hydrograph is equal to

Options :

1. ✖ Depth of runoff
2. ✖ Rain depth
3. ✔ Volume of runoff
4. ✖ Intensity

Question Number : 177 Question Id : 47720317801 Display Question Number : Yes Is Question Mandatory : No

Bunds and terraces in a watershed

Options :

1. ✖ Increase the length of slope
2. ✔ Decrease the length of slope
3. ✖ Increase the erosion
4. ✖ Increase the runoff

Question Number : 178 Question Id : 47720317802 Display Question Number : Yes Is Question Mandatory : No

Sprinkler system is not usually suitable for the soils having infiltration rate less than

Options :

1. ✖ 5 mm/h
2. ✔ 4 mm/h
3. ✖ 3 mm/h
4. ✖ 6 mm/h

Question Number : 179 Question Id : 47720317803 Display Question Number : Yes Is Question Mandatory : No

To obtain better uniformity, the laterals are located in the general direction of

Options :

1. ✖ Valley lines
2. ✔ Contour
3. ✖ Minor slope
4. ✖ Ridge line

Question Number : 180 Question Id : 47720317804 Display Question Number : Yes Is Question Mandatory : No

Variation of discharge from emitters along a lateral line is function of

Options :

1. ✔ Inlet pressure
2. ✖ Emitter pressure
3. ✖ Total flow rate
4. ✖ Velocity

Question Number : 181 Question Id : 47720317805 Display Question Number : Yes Is Question

Mandatory : No

In India, available discharge rate of emitter is

Options :

1. ✓ 4 Lph

2. ✗ 5 Lph

3. ✗ 6 Lph

4. ✗ 7 Lph

Question Number : 182 Question Id : 47720317806 Display Question Number : Yes Is Question Mandatory : No

Number of nozzles for most commonly used sprinkler heads is

Options :

1. ✗ 1

2. ✓ 2

3. ✗ 3

4. ✗ 4

Question Number : 183 Question Id : 47720317807 Display Question Number : Yes Is Question Mandatory : No

Mechanically operated clutch pedal free movement should be

Options :

1. ✖ $4/7''$ to $2''$
2. ✖ $2/6''$ to $3''$
3. ✔ $3/4''$ to $1''$
4. ✖ $5/9''$ to $2''$

Question Number : 184 Question Id : 47720317808 Display Question Number : Yes Is Question Mandatory : No

Differential casing is rigidly attached with

Options :

1. ✖ Crown wheel only
2. ✖ Ring gear only
3. ✔ Both Crown wheel and Ring gear
4. ✖ Bevel pinion

Question Number : 185 Question Id : 47720317809 Display Question Number : Yes Is Question Mandatory : No

Difference in the distance of the centre lines of the back end and front end of front wheels of a tractor is called as

Options :

1. ✖ Wheel track
2. ✔ Toe-in
3. ✖ Toe-out
4. ✖ Ground clearance

Question Number : 186 Question Id : 47720317810 Display Question Number : Yes Is Question Mandatory : No

Hydraulic pump of a tractor hydraulic system should be developing the oil pressure between

Options :

1. ✔ 150 to 200 kg/cm²
2. ✖ 15 to 20 kg/cm²
3. ✖ 15 to 200 kg/cm²
4. ✖ 150 to 400 kg/cm²

Question Number : 187 Question Id : 47720317811 Display Question Number : Yes Is Question Mandatory : No

Anaerobic digestion process generates mostly

Options :

1. ✖ $\text{CO} + \text{CH}_4$

2. ✔ $\text{CO} + \text{NH}_3$

3. ✖ $\text{CO}_2 + \text{CH}_4$

4. ✖ $\text{CO}_2 + \text{NH}_3$

Question Number : 188 Question Id : 47720317812 Display Question Number : Yes Is Question Mandatory : No

For using any type of biomass this gasifier is preferred

Options :

1. ✖ Updraft

2. ✖ Downdraft

3. ✖ Cross draft

4. ✔ Fluidized bed

Question Number : 189 Question Id : 47720317813 Display Question Number : Yes Is Question Mandatory : No

Oil content of jatropha seed is (by weight basis)

Options :

1. ✖ 50-55%

2. ✖ 40-45%

3. ✔ 30-35%

4. ✖ 20-25%

Question Number : 190 Question Id : 47720317814 Display Question Number : Yes Is Question Mandatory : No

pH of slurry in the acid formation stage for biogas production is

Options :

1. ✖ 8 and above

2. ✔ 6 or less

3. ✖ 6.5 to 8

4. ✖ 10 and above

Question Number : 191 Question Id : 47720317815 Display Question Number : Yes Is Question Mandatory : No

If the sum of all the forces acting on a body is zero, then body may be in equilibrium provided the forces are

Options :

1. ✓ Concurrent
2. ✗ Parallel
3. ✗ Like parallel
4. ✗ Unlike parallel

Question Number : 192 Question Id : 47720317816 Display Question Number : Yes Is Question Mandatory : No

Centre of gravity of a triangle lies at what distance from its base

Options :

1. ✓ $(\frac{1}{3})h$
2. ✗ $(\frac{3}{2})h$
3. ✗ $(\frac{4}{3})h$
4. ✗ $(\frac{5}{6})h$

Question Number : 193 Question Id : 47720317817 Display Question Number : Yes Is Question Mandatory : No

Law of machine is given by the relation

Options :

1. ✖ $P = mw - c$
2. ✔ $P = mw + c$
3. ✖ $P = m - wc$
4. ✖ $P = mw \pm c$

Question Number : 194 Question Id : 47720317818 Display Question Number : Yes Is Question Mandatory : No

In a kinematic chain, a quaternary joint is equivalent to

Options :

1. ✖ One binary joint
2. ✖ Two binary joints
3. ✔ Three binary joints
4. ✖ Four binary joints

Question Number : 195 Question Id : 47720317819 Display Question Number : Yes Is Question Mandatory : No

Liquid penetrant test is used for detecting

Options :

1. ✖ Voids in casting
2. ✔ Surface cracks
3. ✖ Strength
4. ✖ Hardness

Question Number : 196 Question Id : 47720317820 Display Question Number : Yes Is Question Mandatory : No

Reciprocal of resistance is called as

Options :

1. ✖ Capacitance
2. ✔ Conductance
3. ✖ Conductivity
4. ✖ Resistivity

Question Number : 197 Question Id : 47720317821 Display Question Number : Yes Is Question Mandatory : No

Material used in dry type finned capacitor is

Options :

- 1. ✖ Ceramic glass
- 2. ✖ Mica
- 3. ✔ Aluminum
- 4. ✖ Copper

Question Number : 198 Question Id : 47720317822 Display Question Number : Yes Is Question Mandatory : No

Two resistors $10\ \Omega$ and $20\ \Omega$ are connected in parallel, then the total resistance of the circuit is

Options :

- 1. ✖ $6.60\ \Omega$
- 2. ✔ $0.15\ \Omega$
- 3. ✖ $30\ \Omega$
- 4. ✖ $15\ \Omega$

Question Number : 199 Question Id : 47720317823 Display Question Number : Yes Is Question Mandatory : No

Which of the following part is related to 3-phase motor?

Options :

1. ✓ Rotor

2. ✗ Tube

3. ✗ End rod

4. ✗ Fan

Question Number : 200 Question Id : 47720317824 Display Question Number : Yes Is Question Mandatory : No

In A.C motor, at full load the rotor speed is usually about (of that of rotating field)

Options :

1. ✗ 98%

2. ✓ 97%

3. ✗ 96%

4. ✗ 95%