Notations:
1. Options shown in green color and with ✔️ icon are correct.
2. Options shown in red color and with ✗ icon are incorrect.
Mathematics

Section Number : 1
Mandatory or Optional : Mandatory
Number of Questions : 80
Number of Questions to be attempted : 80
Section Marks : 80
Display Number Panel : Yes
Group All Questions : Yes
Mark As Answered Required? : Yes

Question Number : 1 Question Id : 813561641 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

\[ \sin \left( \frac{5\pi}{3} \right) + \sec \left( \frac{13\pi}{3} \right) = \]

Options :

1. \( \sqrt{2} - \frac{\sqrt{3}}{2} \)
2. \( 2 + \frac{\sqrt{3}}{2} \)
3. \( \sqrt{3} + \frac{1}{\sqrt{2}} \)
4. \( \sqrt{3} - \frac{1}{\sqrt{2}} \)
Question Number : 2 Question Id : 813561642 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the coefficients of $x^9$ and $x^{10}$ in the binomial expansion of $\left(3 + \frac{x}{2}\right)^n$ are equal, then $n =$

$$\left(3 + \frac{x}{2}\right)^n$$

Options :
1. ✔ 69
2. ✗ 96
3. ✗ 66
4. ✗ 99

Question Number : 3 Question Id : 813561643 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

By neglecting $x^4$ and higher powers of $x$, find approximate value of $\frac{3}{\sqrt{x^2 + 64}} - \frac{3}{\sqrt{x^2 + 27}}$

Options :
1. ✗
2. ✔
In a bank, the principal increases continuously at the rate of 6% per year. Then the time required to double 6000 rupees is ____ (in years)

Options:
1. $\frac{50}{3} \log 2$
2. $\frac{50}{3} \log 6$
3. $\frac{50}{3} \log 3$
4. $\frac{50}{3} \log 12$
Question Number : 5 Question Id : 813561645 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The point to which the origin should be shifted so that the equation \( y^2 - 6y - 4x + 13 = 0 \) is transformed to the form \( y^2 + Ax = 0 \) is

\[ y^2 - 6y - 4x + 13 = 0 \]
\[ \text{is transformed to} \]
\[ y^2 + Ax = 0 \]

Options :

1. ✗ (3, 1)

2. ✗ (-1, -1)

3. ✓ (1, 3)

4. ✗ (-1, 3)

Question Number : 6 Question Id : 813561646 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2).

(3, 4) and (-1, 2) పద్ధతిలో నిలిచిన రెండు రేఖాంశాలు వచ్చి సమాంతరం రేఖ సంఖ్యలు _______

Options :

1. ✓ \( 2x + y - 5 = 0 \)

2. ✗ \( 2x - y + 5 = 0 \)
3. \(2x + y + 5 = 0\)

4. \(2x - y - 5 = 0\)

Question Number : 7 Question Id : 813561647 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Geometrically, the set \(\{z \in \mathbb{C} : |z - 2 - 2i| \leq 1\}\) represents __________

\(\{z \in \mathbb{C} : |z - 2 - 2i| \leq 1\}\) ఎంతం చివరి జంతువు తయారు చేసి ఇది మొదటి సమితి?

Options :

1. a closed circular disc with center at \((-2, -2)\) and with radius 1.
   \(\text{ఒంట్లోనే వేల వందన ఉంటే, కేంద్రం \((-2, -2)\) రేఖాంశం 1.}\)

2. a closed circular disc with center at \((2, 2)\) and with radius 1.
   \(\text{ఒంట్లోనే వేల వందన ఉంటే, కేంద్రం \((2, 2)\) రేఖాంశం 1.}\)

3. a closed circular disc with center at \((1, 1)\) and with radius 0.5.
   \(\text{ఒంట్లోనే \((1, 1)\) రేఖాంశం 0.5 ఎంతం నాయక వేల వందన ఉంటే}\)

4. a closed circular disc with center at \((-1, -1)\) and with radius 0.5.
   \(\text{ఒంట్లోనే \((-1, -1)\) రేఖాంశం 0.5 ఎంతం నాయక వేల వందన ఉంటే}\)

Question Number : 8 Question Id : 813561648 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
If the probability for A to fail in an exam is 0.2 and that for B is 0.3, then the probability that either A or B fails is ≤ ___

నంతరం A, B మీద ఫాఇల్ చేసేవారు నియోగించని అవసరం 0.2 మాత్రమే 0.3.
నంతరం A ఇంటి B నంతరం ఫాఇల్ చేసేవారు నియోగించని అవసరం ≤ ___

Options:
1. ✗ 0.2
2. ✗ 0.4
3. ✔ 0.5
4. ✗ 0.3

Question Number : 9 Question Id : 813561649 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

All the words that can be formed using alphabets $A, H, L, U, R$ are written as in dictionary (no alphabet is repeated). Then the rank of the word $RAHUL$ is _______

$A, H, L, U, R$ యొక్క సంయుక్తములు (ఇంటి నాణికి అంటే పదార్థాలు యొక్క) లోకం నాణికి సంయుక్తములు నంతరం ఇంటి పతన పదార్థాలు యొక్క సంయుక్తములు, ‘$RAHUL$’
నంతరం ఎలా నంతరం యొక్క పదార్థాలు?

Options:
1. ✗ 70
2. ✗ 71
3. ✗ 73
Find the eccentricity of an ellipse, if the length of its latus rectum is 4 units and distance between its vertex and the nearest focus is 3/2 units.

Options:

1. \( \frac{1}{3} \)

2. \( \frac{2}{3} \)

3. \( \frac{1}{9} \)

4. \( \frac{3}{4} \)
The feet of perpendicular from the point \( A(1, 0, 3) \) to the join of the points \( B(4, 7, 1) \) and \( C(3, 5, 3) \) is

\[ B(4, 7, 1) \text{ र } C(3, 5, 3) \text{ वर्तमान एक त्रिभुज आवश्यक नहीं } A(1, 0, 3) \text{ कि गिनती हमेशा हटाना है।} \]

Options:

1. \( \left( \frac{5}{3}, \frac{7}{3}, \frac{17}{3} \right) \)
2. \( \left( \frac{10}{3}, \frac{17}{3}, \frac{6}{3} \right) \)
3. \( \left( 0, \frac{1}{2}, \frac{3}{2} \right) \)
4. \( \left( \frac{1}{5}, \frac{3}{5}, \frac{7}{5} \right) \)

Question Number: 12 Question Id: 813561652 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical

Solve the equation \( 3^{x^2-x} = 25 - 4^{x^2-x} \)

\[ 3^{x^2-x} = 25 - 4^{x^2-x} \text{ नीचे समाधान होते} \]

Options:

1. \(-1\) only
2. \(2\) only
3. \(-1\) only
Both $-1$ and $2$
$-1$ మైన్‌స్కి $2$ మైన్‌స్కి

No Solution

4. × స్టేటింగ్ ఇది

Question Number : 13 Question Id : 813561653 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If $\theta \in \left(0, \frac{\pi}{2}\right)$, then
\[
\begin{vmatrix}
\sin \theta + \csc \theta & \sin \theta - \csc \theta & 2020 \\
\cos \theta + \sec \theta & \cos \theta - \sec \theta & 2020 \\
\tan \theta + \cot \theta & \tan \theta - \cot \theta & 2020
\end{vmatrix} =
\]

If $\theta \in \left(0, \frac{\pi}{2}\right)$ సమీఖ్యా, తేదీ
\[
\begin{vmatrix}
\sin \theta + \csc \theta & \sin \theta - \csc \theta & 2020 \\
\cos \theta + \sec \theta & \cos \theta - \sec \theta & 2020 \\
\tan \theta + \cot \theta & \tan \theta - \cot \theta & 2020
\end{vmatrix} =
\]

Options :

1. × 1

2. × $-1$

3. ✔ 0

4. × 2020

Question Number : 14 Question Id : 813561654 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
The derivative of $y = \tan^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$ with respect to $x$ is equal to

$$y = \tan^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$$

Options:

1. $\times -1$
2. $\times 0$
3. $\times \pm 2$
4. $\checkmark \pm \frac{1}{2}$

Question Number : 15 Question Id : 813561655 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$$f(x) = \begin{cases} 
\frac{x - 4}{|x - 4|} + a, & x < 4 \\
a + b, & x = 4 \\
\frac{x - 4}{|x - 4|} + b, & x > 4 
\end{cases}$$

If $f(x)$ given above is continuous at $x = 4$, then find the values of ‘$a$’ and ‘$b$’.

Options:

1. $\checkmark a = 1, \ b = -1$
2. \[ a = -1, \ b = 1 \]

3. \[ a = 1, \ b = 1 \]

4. \[ a = -1, \ b = -1 \]

Question Number : 16 Question Id : 813561656 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let the equation of the curve passing through the point \((0, 1)\) be given by \(y = \int x^3 e^{x^4} \, dx\). If the equation of the curve is written in the form \(x = f(y)\), then \(f(y) = \)

\((0, 1)\) నిమిచ రేఖా రేఖ ఉంది ఆయామ కలిగిన యు యు ఎంపీ ఎంపోకాలు యు యు ఎంపీ ఎంపోకాలు

\(x = f(y)\) అని అంటే, అలాంటే \(f(y) = \)

Options :

1. \[ \log |4y - 3| \]

2. \[ (\log |4y - 3|)^{1/4} \]

3. \[ \left(\log \left|\frac{3-4y}{4}\right|\right)^{1/4} \]

4. \[ \log \left|\frac{4y-3}{4}\right| \]

Question Number : 17 Question Id : 813561657 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
The interval in which \( y = \ln(\ln(x)) \), \( x > 1 \) is decreasing is

\[ x > 1, \ y = \ln(\ln(x)) \]  రే 

**Options:**

1. \((-\infty, 0) \cup (2, \infty)\)

2. \((0, 2)\)

3. \((0, 1)\)

4. \((-1, 0)\)

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If \( \vec{a} = 2\hat{i} - 3\hat{j} - 4\hat{k}, \) \( \vec{b} = \hat{i} + 4\hat{j} - 2\hat{k}, \) \( \vec{c} = 3\hat{i} - \hat{j} + 4\hat{k} \) then, \( [\vec{a} \times \vec{b} \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}] = \)

\[ \vec{a} = 2\hat{i} - 3\hat{j} - 4\hat{k}, \) \( \vec{b} = \hat{i} + 4\hat{j} - 2\hat{k}, \) \( \vec{c} = 3\hat{i} - \hat{j} + 4\hat{k} \) ఉంటే, \( [\vec{a} \times \vec{b} \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}] = \)

**Options:**

1. \(-4900\)

2. \(-6400\)

3. \(-8100\)

4. \(-12100\)
Bill and George go target shooting together. Both shoot at a target at the same time. Suppose Bill hits the target with probability 0.7 where as George, independently, hits the target with probability 0.4. Given that exactly one shot hit the target, what is the probability that it was George’s shot?

Options:

1. \( \frac{2}{3} \)

2. \( \frac{2}{9} \)

3. \( \frac{1}{9} \)

4. \( \frac{8}{9} \)

If \( \alpha, \beta, \gamma \) are the roots of \( f(x) = x^3 - 9x^2 + 26x - 24 \), then \( \frac{1}{\alpha}, \frac{1}{\beta}, \frac{1}{\gamma} \) are the roots of

\[ f(x) = x^3 - 9x^2 + 26x - 24 \]
1. \(24x^3 + 26x^2 + 9x - 1\)

2. \(24x^3 - 26x^2 + 9x - 1\)

3. \(24x^3 + 26x^2 - 9x - 1\)

4. \(24x^3 - 26x^2 + 9x + 1\)

Question Number : 21 Question Id : 813561661 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If \(x \neq 0\), then
\[
\frac{\sin(\pi + x) \cos\left(\frac{\pi}{2} + x\right) \tan\left(\frac{3\pi}{2} - x\right) \cot(2\pi - x)}{\sin(2\pi - x) \cos(2\pi + x) \csc(-x) \sin\left(\frac{3\pi}{2} + x\right)} =
\]

\(x \neq 0\) རྟོག་དེ་དཔེར་
\[
\frac{\sin(\pi + x) \cos\left(\frac{\pi}{2} + x\right) \tan\left(\frac{3\pi}{2} - x\right) \cot(2\pi - x)}{\sin(2\pi - x) \cos(2\pi + x) \csc(-x) \sin\left(\frac{3\pi}{2} + x\right)} =
\]

Options :
1. \(0\)

2. \(-1\)

3. \(1\)

4. \(2\)
Question Number : 22 Question Id : 813561662 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the area bounded by the parabola \( y^2 = 16ax \) and the line \( y = 4mx \) is \( \frac{a^2}{12} \) sq. units, then the value of ‘\( m \)’ is

\[
y^2 = 16ax \quad \text{and} \quad y = 4mx \quad \text{so} \quad \frac{a^2}{12}
\]

Options:
1. ✗ −1
2. ✗ 1
3. ✗ 0
4. ✔ 2

Question Number : 23 Question Id : 813561663 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the maximum distance of the point \( K(10, 7) \) from the circle \( x^2 + y^2 - 4x - 2y - 20 = 0 \)

\[
x^2 + y^2 - 4x - 2y - 20 = 0 \quad \text{so} \quad K(10, 7) \text{ to } \quad \text{maximum} \quad \text{distance} \quad \text{is} \quad \text{_____}
\]

Options:
1. ✗ 25
2. ✗ 10
Question Number : 24 Question Id : 813561664 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

What is the quotient of $x^3 - 5x^2 + 2x + 7$ when divided with $(x - 1)$?

$x^3 - 5x^2 + 2x + 7$ ÷ $(x - 1)$ యొక్క విభాగము అంటే విభాగాన్ని ________

Options:
1. $x^2 + 4x - 2$
2. $x^2 - 4x + 2$
3. $x^2 + 4x + 2$
4. $x^2 - 4x - 2$

Question Number : 25 Question Id : 813561665 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
The equation of the line through the intersection of \(3x - 4y + 1 = 0\) and \(5x + y - 1 = 0\) which cuts off equal intercepts on the axes is given by

\[
3x - 4y + 1 = 0 \quad \text{and} \quad 5x + y - 1 = 0 \quad \text{are parallel lines.}
\]

Options:
1. ✔️ \(23x + 23y - 11 = 0\)
2. ✗ \(23x + 23y + 11 = 0\)
3. ✗ \(23x - 23y - 11 = 0\)
4. ✗ \(23x - 23y + 11 = 0\)

If \(2 + 4i\) is one of the roots of \(x^2 + bx + c = 0\) with \(b, c \in \mathbb{R}\), then \((b, c) = \ldots\)

\[
b, c \in \mathbb{R} \text{ such that } x^2 + bx + c = 0 \text{ has } 2 + 4i \text{ as a root. Hence, } (b, c) = \ldots
\]

Options:
1. ✗ \((4, -20)\)
2. ✗ \((4, 20)\)
3. ✗ \((-4, -20)\)
4. ✔️ \((-4, 20)\)
If $\alpha$, $\beta$ and $\gamma$ are angles that satisfy the following conditions, find the value of $xyz$.

\[ \alpha, \beta, \gamma \text{ are angles such that } \tan(\alpha) + \tan(\beta) + \tan(\gamma) = \tan(\alpha) \cdot \tan(\beta) \cdot \tan(\gamma) \]

Options:
1. but not $-1$
2. $\pm 1$
3. $0$
4. $1$, $2$, $3$, $4$, $5$, $6$, $7$, $8$, $9$, $0$

Question Number : 28 Question Id : 813561668 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Find the equation of pair of straight lines that bisect the angles between the lines represented by \( ax^2 + 2hxy + by^2 = 0 \).

\[
ax^2 + 2hxy + by^2 = 0
\]

Options:

1. \( \frac{x^2 + y^2}{a+b} = \frac{xy}{h} \)
2. \( \frac{x^2 + y^2}{a-b} = \frac{xy}{h} \)
3. \( \frac{x^2 + y^2}{a-b} = \frac{h}{xy} \)
4. \( \frac{x^2 - y^2}{a-b} = \frac{xy}{h} \)

Question Number : 29 Question Id : 813561669 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let \( u \) and \( v \) be two vectors in a plane. Then any vector \( w \) in the plane can be written as \( w = au + bv \) for some scalars ‘\( a \)’ and ‘\( b \)’ if and only if

\[
u, v \text{ are linearly independent. } \implies \exists w = au + bv \text{ for all } a, b \in \mathbb{R}
\]

Options:

None of \( u \) and \( v \) is a scalar multiple of the other
1. \( u, v \text{ are linearly independent} \)

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None of \(|u|\) and \(|v|\) is a scalar multiple of the other
\(|u|, |v| \text{ లు ఒక్కొక్కు నాటినివేసిన వాటి అంశాలు రాకుండా}

2. ✗

\(u\) and \(v\) have different direction
\(u, v \text{ ఏ విశేషంగా కలిగి ఉంటాయా}

3. ✗

\(u\) and \(v\) are perpendicular to each other
\(u, v \text{ ఏ విశేషంగా సంపాదించాయా}

4. ✗

Question Number : 30 Question Id : 813561670 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let \(M\) and \(N\) be two invertible square matrices over \(\mathbb{R}\) of order 2 such that \(N\) is diagonal.

Then \(MN^{-1}\) is diagonal \__________

\(M\) మరియు \(N\) ఒక విభాగం వర్గమైన రైతిశాల దృశ్యం వ్యాఖ్యాతమైనందువల జాబితా నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య నిత్య

Options :

For all \(M\)

1. ✗

Only when \(M\) is a scalar matrix

2. ✗

For all diagonal matrices \(M\)

3. ✔

4. ✗
Question Number : 31 Question Id : 813561671 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

\[ \int \frac{\sin^3(x) + \cos^3(x)}{\sin^2(x) \cdot \cos^2(x)} \, dx = \]

Options :
1. ✔ sec(x) − cosec(x) + c
2. ✗ tan(x) + cot(x) + c
3. ✗ cosec(x) − cot(x) + c
4. ✗ tan(x) − cot(x) + c

Question Number : 32 Question Id : 813561672 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If \( x = e^{y + e^{y + e^{y + \cdots}}} \), then \( \frac{dy}{dx} = \)

\( x = e^{y + e^{y + e^{y + \cdots}}} \), then \( \frac{dy}{dx} = \)

Options :
If \( \vec{a} \) and \( \vec{b} \) are unit vectors such that \( \vec{a} + \vec{b} \) is also a unit vector, then the angle between \( \vec{a} \) and \( \vec{b} \) is \( \theta \). \[ \frac{1}{1+x} \]

Options:
1. 60°
2. 90°
3. 30°
4. 120°
Question Number : 34 Question Id : 813561674 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If \( y = \text{Cosec}^{-1}(x) \) and \( \frac{dy}{dx} = \frac{-1}{|x| \sqrt{x^2 - 1}} \), then

\( y = \text{Cosec}^{-1}(x) \) \( \Rightarrow \) \( \frac{dy}{dx} = \frac{-1}{|x| \sqrt{x^2 - 1}} \) \( \square \). 

Options :
1. \( y \in \left( -\frac{\pi}{2}, 0 \right) \)
2. \( y \in \left( -\frac{\pi}{2}, 2\pi \right) \)
3. \( y \in \left( -\frac{\pi}{2}, 0 \right) \cup \left( 0, \frac{\pi}{2} \right) \)
4. \( y \in \mathbb{R} \)

Question Number : 35 Question Id : 813561675 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Angle between the lines of intersection of the planes \( x - y = 0 \), \( 2x + y + z = 0 \) and \( 2x - z = 0 \), \( x + y - 3z = 0 \) is

\( x - y = 0 \), \( 2x + y + z = 0 \) \( \text{సమాధానం} \) \( 2x - z = 0 \), \( x + y - 3z = 0 \) \( \text{సమాధానం} \)

\( \text{మిగిలిన తోడ్డు నిండు ఇచ్చా} \)

Options :
1. \( 60^\circ \)
2. × 45°
3. × 30°
4. ✔ 90°

Question Number : 36 Question Id : 813561676 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let O denote the origin. If M(1, 2), N(0,1) and A(x, y) are points such that xy > 0 and x + y < 1, then choose the correct statement.

O మట్టానికి, M(1, 2), N(0,1) లేదా A(x, y) అంతర్నిష్పత్తిలో xy > 0 మరియు x + y < 1 మామిడి, ఎవరి విషయం వాటి వినాయకం?

Options :

A cannot lie inside ΔOMN
1. × ΔOMN ఇది A ఎదురుడు

A lies inside ΔOMN
2. × ΔOMN ఇది A ఎదురు

A lies only in the first quadrant
3. × A మొదట ప్రముఖం పరిమితి ఎదురు

A lies inside ΔOMN or in the third quadrant
4. ✔ ΔOMN ఇది A ఎదురు తరువాత పరిమితి ఎదురు A ఎదురు
The centre of a circle is \((2, -3)\) and the circumference is \(10\pi\). Then its equation is

\[ x^2 + y^2 - 4x + 6y - 12 = 0 \]

Options:
1. \( x^2 + y^2 + 4x + 6y + 12 = 0 \)
2. \( x^2 + y^2 - 4x + 6y + 12 = 0 \)
3. \( x^2 + y^2 - 4x + 6y - 12 = 0 \)
4. \( x^2 + y^2 - 4x - 6y - 12 = 0 \)

\[ \lim_{x \to 0} \frac{a^x - 1}{\sin(x)} = \]

Options:
1. \( \log(a) \)
2. \( \frac{1}{2} \log(a) \)
3. 0
4. 1
Let \( P(n) \): \( 1^2 + 2^2 + 3^2 + \ldots + n^2 = \frac{6(n-1)(n-2)\ldots(n-2020)+2n^3+3n^2+n}{6} \), for all \( n \in N \). Then which of the following is correct?

\( P(n) \): \( 1^2 + 2^2 + 3^2 + \ldots + n^2 = \frac{6(n-1)(n-2)\ldots(n-2020)+2n^3+3n^2+n}{6} \), \( \forall n \in N \),

Options:

1. \( P(n) \) is true for all \( n \in N \)
2. \( P(n) \) is true for all \( n > 2020 \)
3. \( P(n) \) is true for all \( n \leq 2020 \)
4. \( P(n) \) is not true for any \( n \in N \)
If $n P_4 = 1680$, then $n =$

$n P_4 = 1680$ తెగా, $n =$

Options :
1. $\times$ 6
2. $\times$ 12
3. $\times$ 10
4. $\checkmark$ 8

Question Number : 41 Question Id : 813561681 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let $\vec{u} = -2\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{v} = \hat{i} - 2\hat{j} + 2\hat{k}$. Then angle between $\vec{u}$ and $\vec{v}$ is ____

$\vec{u} = -2\hat{i} + 2\hat{j} + \hat{k}$ లేదా $\vec{v} = \hat{i} - 2\hat{j} + 2\hat{k}$ ఉంటే $\vec{u}$ మరియు $\vec{v}$ యొక్క తూర్పు రేటు ఉంటుంది ____

Options :
1. $\checkmark$ $\cos^{-1}\left(\frac{4}{9}\right)$
2. $\times$ $\cos^{-1}\left(-\frac{4}{3}\right)$
3. $\times$ $\cos^{-1}\left(\frac{4}{3}\right)$
4. $\times$ $\sin^{-1}\left(-\frac{4}{9}\right)$

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Question Number : 42 Question Id : 813561682 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the sum of the order and degree of the differential equation \( y = x \left( \frac{dy}{dx} \right)^3 + \frac{d^2y}{dx^2} \)

\[ y = x \left( \frac{dy}{dx} \right)^3 + \frac{d^2y}{dx^2} \text{ అనేది అనుసంధానం సాధనం మాత్రమే మద్యపాత తెలిసిన విధానం = } \]

Options :
1. ✗ 2
2. ✓ 3
3. ✗ 4
4. ✗ 5

Question Number : 43 Question Id : 813561683 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If a random variable \( X \) takes the values \( x_1, x_2, x_3, ..., x_{100} \) with probability \( P(X = x_i) = K \times i(i + 1) \), then 200\( K = \)

\[ X \text{ సంఖ్యలు } x_1, x_2, x_3, ..., x_{100} \text{ యొక్క సాధనం మాత్రమే. } P(X = x_i) = K \times i(i + 1), \]

\[ K \text{ యొక్క సంఖ్య } 200K = \]

Options :
1. ✗ \( \frac{1}{1707} \)
2. \(\frac{1}{1717}\)

3. \(\frac{1}{1727}\)

4. \(\frac{1}{1777}\)

**Question Number : 44 Question Id : 813561684 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

If \(f: R \rightarrow R\) is defined as \(f(x) = \frac{2020^x}{2020^x + \sqrt{2020}}, \forall x \in R\), then \(\sum_{r=1}^{4039} 2f\left(\frac{r}{4040}\right) =\)

\[ f(x) = \frac{2020^x}{2020^x + \sqrt{2020}}, \forall x \in R, \text{ ให้รู้ว่า} \sum_{r=1}^{4039} 2f\left(\frac{r}{4040}\right) =\]

**Options :**

1. 4040

2. 4039

3. 2020

4. 1010

**Question Number : 45 Question Id : 813561685 Question Type : MCQ Display Question**
For a right-angled triangle having the lengths of two sides as $2\sqrt{2}$ and 5, find the length of the third side.

Options:
1. $4\sqrt{2}$
2. $\sqrt{15}$
3. $\sqrt{17}$
4. $\sqrt{13}$

The coefficients of $x^{50}$ in $(1 + x)^{101}(1 - x + x^2)^{100}$ is ______

Options:
1. 1
2. $-1$
3. 0
4. 2
Question Number : 47 Question Id : 813561687 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

\[ \frac{n+1}{r+1} \binom{n+1}{r+1} = \frac{n-r+1}{m} \]

Then \( m = \)

\[ \frac{n+1}{r+1} \binom{n+1}{r+1} = \frac{n-r+1}{m} \]  \( \text{THESE IS M} \)

Options : 
1. \( r \)
2. \( r - 1 \)
3. \( r + 1 \)
4. \( 1 - r \)

Question Number : 48 Question Id : 813561688 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The Parabola with directrix \( x + 2y - 1 = 0 \) and focus \((1, 0)\) is \(\ldots\)

\((1, 0)\) \(\text{এর} \ x + 2y - 1 = 0 \) \(\text{বিশিষ্টকে} \) \(\text{সে} \) \(\text{এর} \) \(\ldots\)

Options : 
1. \( 4x^2 - 4xy + y^2 - 8x + 4y + 4 = 0 \)
2. \[4x^2 + 4xy + y^2 - 8x + 4y + 4 = 0\]

3. \[4x^2 + 4xy + y^2 + 8x - 4y + 4 = 0\]

4. \[4x^2 - 4xy + y^2 - 8x - 4y + 4 = 0\]

Question Number: 49 Question Id: 813561689 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical

What is the formula for finding co-efficient of variation, given \(\sigma = \) standard deviation and \(\bar{x} = \) mean \(\neq 0\)?

\[
\frac{\text{何必找的}}{\text{何必找的}} \times 100
\]

Options:

1. \[
\frac{\bar{x}}{\sigma} \times 100
\]

2. \[
\frac{\bar{x}}{\sigma}
\]

3. \[
\frac{\sigma}{\bar{x}}
\]

4. \[
\frac{\sigma}{\bar{x}} \times 100
\]
\[
\tan \left( \frac{-23\pi}{3} \right) - \cot \left( \theta - \frac{13\pi}{3} \right) =
\]

Options:
1. \( \sqrt{3} + \cot \theta \)

2. \( \sqrt{3} - \tan \left( \frac{\pi}{6} + \theta \right) \)

3. \( \sqrt{3} + \tan \theta \)

4. \( \sqrt{3} + \cot \left( \frac{\pi}{3} - \theta \right) \)

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Question Number : 51 Question Id : 813561691 Question Type : MCQ Display Question
Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
Orientation : Vertical

If \( ^nC_r \) denotes the number of combinations of \( 'n' \) things taken \( 'r' \) at a time, then the expression \( ^nC_{r+1} + ^nC_{r-1} + 2^nC_r \) equals

\( ^nC_r \) ఎంతవిధానం ఉత్స ఉంటే \( 'n' \) విధానం ఉంటే \( 'r' \) విధానం ఉంటే \( ^nC_r \) ఎంతవిధానం ఉంటే \( 'n' \) విధానం ఉంటే

కానీ, \( ^nC_{r+1} + ^nC_{r-1} + 2^nC_r = \)

Options:
1. \( ^{n+2}C_r \)

2. \( ^{n+2}C_{r+1} \)
\( \binom{n+1}{r} \)

\( \binom{n+1}{r+1} \)

**Question Number : 52 Question Id : 813561692 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

\[
\lim_{{n \to \infty}} \frac{2^2 + 4^2 + 6^2 + \cdots + (2n)^2}{n^3} =
\]

**Options :**

1. \( \frac{2}{3} \)
2. \( \frac{4}{3} \)
3. \( \frac{3}{2} \)
4. \( \frac{8}{7} \)

**Question Number : 53 Question Id : 813561693 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**
Find the degree of the differential equation $y^{2/3}_3 + 2 + 3y_2 + y_1 = 0$.

$y^{2/3}_3 + 2 + 3y_2 + y_1 = 0$ బహుపద్య కోసం ఎరుపు అయినను తెలుసుమను.

Options:

1. ✗ 4
2. ✔ 2
3. ✗ 3
4. ✗ 1

Question Number : 54 Question Id : 813561694 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

For the ellipse $\frac{x^2}{18} + \frac{y^2}{32} = 1$, if a tangent with slope $\frac{-4}{3}$ intersects the major and minor axes at $P$ and $Q$ respectively, find $P$ and $Q$.

$$\frac{x^2}{18} + \frac{y^2}{32} = 1$$ ఎక్సెస్యూపు సరువుతునొకగాను అంచెంతును మాయిపొందింది $P$ మాయి $Q$ మాయి ఎక్సెస్యూపు సరుంతు ఎమిటు ఎమిటు ________

Options:

1. ✔ $P(6, 0)$, $Q(0, 8)$
2. ✗ $P(0, 6)$, $Q(8, 0)$
3. ✗ $P(3\sqrt{2}, 0)$, $Q(0, 4\sqrt{2})$
4. \( P(0, 3\sqrt{2}), Q(4\sqrt{2}, 0) \)

**Question Number : 55** Question Id : 813561695 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The mean of 5 observations is 15 and variance is 9. If two observations having values 
-5 and 13 are combined with these observations, then what will be the new variance?

5 అంశాలు యొక్క మధ్యమం 15 మధ్యమం రాయాలి. అప్పుడు అంశాలు 
-5, 13 యొక్క మధ్యమం యొక్క విదేశం 9 మధ్యమం రాయాలి. అప్పుడు నవినమైన 
విదేశం నవినమైన మధ్యమం రాయాలి. అప్పుడు నవినమైనం నవినమైన మధ్యమం రాయాలి.

**Options :**

1. \( \frac{6259}{7} \)

2. \( \frac{6259}{49} \)

3. \( \frac{2659}{7} \)

4. \( \frac{2659}{49} \)

**Question Number : 56** Question Id : 813561696 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
If \( r = \text{inradius}, \Delta = \text{Area of } \Delta ABC, s = \text{semi-perimeter} \) then which of the following is true?

\[ ABC \text{ వచ్చెంతో } r = \text{ సరిమాంచు యొక్క కృతిలుచు, } \Delta = \text{ క్రింది యొక్క కృతిలుచు, } s = \text{ మొత్తం యొక్క కృతిలుచు, } \]

\[ \Delta = r + s \]

\[ \Delta = \frac{r}{s} \]

\[ \Delta = (rs)^2 \]

\[ \Delta = rs \]

Question Number : 57 Question Id : 813561697 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Maximum area of the rectangle that can be formed with the fixed perimeter ‘\( p \)’ cm

‘\( p \)’ cm మిలియను పరిమిట్ పొట్టించాలను కొత్త కుంభం కుంభం పరిమిట్ పొట్టించాలను

Options :

\[ \frac{p^2}{8} \text{ cm}^2 \]

\[ \frac{p^2}{16} \text{ cm}^2 \]

\[ \frac{p^2}{64} \text{ cm}^2 \]
Question Number : 58 Question Id : 813561698 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let \( a, b \in \mathbb{R} - \{0\} \), and \( I_2 \) be the identity matrix of order 2. Then the rank of the (block)

\[
\begin{pmatrix}
  aI_2 & bI_2 \\
  aI_2 & bI_2
\end{pmatrix}
\]
is

\[\frac{p^2}{32} \, \text{cm}^2\]

\( a, b \) అంచె మధ్య ఎక్కువ ఎక్కువ మితిమైన \( I_2 \) తొడి 2తొడి మరింత మరింత తరువాతి, 

\[
\begin{pmatrix}
  aI_2 & bI_2 \\
  aI_2 & bI_2
\end{pmatrix}
\]

మరింత మరింత వయండు.

Options :
1. 2
2. 1
3. 4
4. 3

Question Number : 59 Question Id : 813561699 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
If \( y = \sqrt{3}x + k_1 \) and \( y = \sqrt{3}x + k_2 \) are two parallel tangents of a circle of radius 2 units, then \( |k_1 - k_2| \) is equal to

\[
2 \text{ cm}
\]

Options:
1. ✗ 1
2. ✓ 8
3. ✗ 4
4. ✗ 2

Question Number: 60 Question Id: 813561700 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical

Let \( \vec{u} = \hat{i} - 2\hat{j} \) and \( \vec{v} = -3\hat{i} + 5\hat{j} \). Consider three points \( P, Q \) and \( R \) having position vectors \( \frac{1}{7}\hat{i}, \frac{1}{4}\hat{j} \) and \( -2\hat{i} + 3\hat{j} \) respectively. Among these, the points in the line segment passing through \( \vec{u} \) and \( \vec{v} \) are

\[
\vec{u} = \hat{i} - 2\hat{j}, \quad \vec{v} = -3\hat{i} + 5\hat{j}, \quad \vec{u},\vec{v} \text{ having position vectors } -\frac{1}{7}\hat{i}, -\frac{1}{4}\hat{j},
\]

Options:

Only \( P \) and \( Q \)

1. ✓ \( P \) మరియు \( Q \) సాధ్యం

2. ✗
Only $P$ and $R$

Only $Q$ and $R$

all $P$, $Q$ and $R$

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

Options:

1. \[ \frac{1}{2} \log |1 + 2 \cos(x)| + c \]

2. \[ \frac{1}{2} \log |1 - 2 \tan(x)| + c \]

3. \[ \frac{1}{2} \log |1 + 2 \tan(x)| + c \]

4. \[ \frac{1}{2} \log |1 + 2 \cot(x)| + c \]
Find the equation of circle having normals \((x - 1)(y - 2) = 0\) and a tangent \(3x + 4y = 6\) ?

\[3x + 4y = 6\]  
\[(x - 1)(y - 2) = 0\]  
Are the options given?

Options:

1. \((x - 1)^2 + (y - 2)^2 = 1\)

2. \((x - 2)^2 + (y - 1)^2 = 1\)

3. \((x + 1)^2 + (y + 2)^2 = 1\)

4. \((x + 2)^2 + (y + 1)^2 = 1\)

If the lines \(3x + y - 2 = 0\), \(px + 2y - 3 = 0\) and \(2x - y - 3 = 0\) are concurrent, then \(p =\)

\[3x + y - 2 = 0,\]  
\[px + 2y - 3 = 0,\]  
\[2x - y - 3 = 0,\]

Are the options given?

Options:

1. \(-5\)

2. \(5\)

3. \(3\)

4. \(-3\)
Question Number : 64 Question Id : 813561704 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A circle passes through the centre of another circle \( x^2 + y^2 - 3x - 4y - 1 = 0 \) and whose centre is \((5, 2)\). Then the equation of this circle is ________

\[ x^2 + y^2 - 3x - 4y - 1 = 0 \]  
\[ \text{is the equation of the circle.} \]

Options :

1. \( 4x^2 + 4y^2 - 40x - 16y + 67 = 0 \)

2. \( 3x^2 + 3y^2 - 40x - 16y + 67 = 0 \)

3. \( 2x^2 + 2y^2 - 40x - 16y + 67 = 0 \)

4. \( x^2 + y^2 - 10x - 4y + 67 = 0 \)

Question Number : 65 Question Id : 813561705 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If \( 2f(\sin x) + f(\cos x) = x \) then \( f'(x) = \)

\[ 2f(\sin x) + f(\cos x) = x \]  
\[ \text{then } f'(x) = \]

Options :

1. \( \frac{1}{\sqrt{1-x^2}} \)
Question Number : 66 Question Id : 813561706 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Reduction of proper fraction \( \frac{f(x)}{g(x)} \) into a sum of partial fraction depends up on factorization of \( \square \). 

\( \frac{f(x)}{g(x)} \) ప్రామాణిక ఫంక్షన్ ప్రతి పరిభాష ఫంక్షన్ చేసినా చేరాలి \( \square \) కోసం ఉండాలి 

 вечాయలాడం తిరిగియుతుంది

Options :

1. \( f(x) \) alone

2. \( g(x) \) alone

3. both \( f(x) \) and \( g(x) \)
factors of \( f(x) \) and \( g(x) \)

4. \( f(x) \) యొక్క రెంట్లు \( g(x) \) యొక్క రెంట్లు

Question Number : 67 Question Id : 813561707 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The value of \[
\begin{vmatrix}
\log_5 729 & \log_3 5 \\
\log_5 27 & \log_9 25 \\
\end{vmatrix} \times \begin{vmatrix}
\log_3 5 & \log_{27} 5 \\
\log_5 9 & \log_5 9 \\
\end{vmatrix}
\] is

\[
\begin{vmatrix}
\log_5 729 & \log_3 5 \\
\log_5 27 & \log_9 25 \\
\end{vmatrix} \times \begin{vmatrix}
\log_3 5 & \log_{27} 5 \\
\log_5 9 & \log_5 9 \\
\end{vmatrix} = _____
\]

Options :
1. \( \times \) 1
2. \( \times \) 6
3. \( \times \) \( \log_5 9 \)
4. \( \checkmark \) \( (\log_3 5) \times (\log_5 81) \)

Question Number : 68 Question Id : 813561708 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the chord of contact of tangents from a point A to a given circle passes through B, then the circle with AB as a diameter will _______

\( A \) గోదమున భాగం కంటే \( B \) గోదము నియంత్రించాలని, \( AB \) అంతర్భాగం గుండా ఉంటుంది.
Question Number : 69
Question Id : 813561709
Question Type : MCQ
Display Question Number : Yes
Is Question Mandatory : No
Single Line Question Option : No
Orientation : Vertical

If \( f(x) = e^x \); \( g(x) = \ln(x) \) for all \( x \in [1, \infty) \), then \( f \circ g \) is \[ \text{________} \]

\[ [1, \infty) \) \( \Rightarrow \) \( f(x) = e^x \); \( g(x) = \ln(x) \) \( \Rightarrow \) \( f \circ g \) \[ \text{________} \]

Options :

A one-one function
1. \[ \text{________} \]

An on-to function
2. \[ \text{________} \]

Not a function
3. \[ \text{________} \]
Bijective

Question Number : 70 Question Id : 813561710 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The direction cosines of the vector \( \mathbf{a} = -2 \mathbf{i} + \mathbf{j} - 5 \mathbf{k} \) are

\[ \mathbf{a} = -2 \mathbf{i} + \mathbf{j} - 5 \mathbf{k} \]

Options :

1. \( \frac{-2}{\sqrt{30}}, \frac{1}{\sqrt{30}}, \frac{-5}{\sqrt{30}} \)
2. \( \frac{-2}{\sqrt{8}}, \frac{1}{\sqrt{8}}, \frac{-5}{\sqrt{8}} \)
3. \( \frac{-2}{\sqrt{10}}, \frac{-1}{\sqrt{10}}, \frac{5}{\sqrt{10}} \)
4. \( \frac{-2}{\sqrt{30}}, \frac{-1}{\sqrt{30}}, \frac{-5}{\sqrt{30}} \)

Question Number : 71 Question Id : 813561711 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

\[ \int \frac{(x + 1)^2}{x(x^2 + 1)} \, dx = \]

Options :
1. $\log [x(x^2 + 1)] + c$

2. $\log |x| + c$

3. $\log |x| + 2 \tan^{-1}(x) + c$

4. $2 \log |x| + \tan^{-1}(x) + c$

Question Number : 72 Question Id : 813561712 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The locus of a point $P$ such that $PA + PB = 4$ where $A(2, 3, 4), B(-2, 3, 4)$ is $A(2, 3, 4), B(-2, 3, 4)$ నిందముగా, $PA + PB = 4$ అయితే పోషకం $P$ యొక్క స్థానాంకాలు

Options :
1. $y^2 + z^2 + 6y + 8z + 25 = 0$

2. $y^2 - z^2 + 6y + 8z - 25 = 0$

3. $y^2 + z^2 - 6y - 8z + 25 = 0$

4. $y^2 + z^2 - 6y - 8z - 25 = 0$

Question Number : 73 Question Id : 813561713 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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If \((2 + i)\) is a root of the equation \(x^3 - 5x^2 + 9x - 5 = 0\), then the other roots are

\[x^3 - 5x^2 + 9x - 5 = 0 \Rightarrow (2 + i) \text{ is a root.}\]

**Options:**

1. 1 and \((2 - i)\)
2. \(-1 \text{ and } (3 + i)\)
3. \(-1 \text{ and } (-2 + i)\)
4. 0 and 1

---

The locus of the point whose ratio of distance from the origin to its distance from \((-2, -3)\) is \(5:7\), is given by ______

**Options:**

1. \(24(x^2 + y^2) - 100x - 150y - 325 = 0\)
2. \(24(x^2 + y^2) + 100x + 150y - 325 = 0\)
3. \[24(x^2 + y^2) - 100x + 150y + 325 = 0\]

4. \[2x^2 + 2y^2 = 325\]

Question Number : 75 Question Id : 813561715 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The possible value of \(\sin^6(\theta) + \cos^6(\theta) - 3\cos^4(\theta)\) is

\[\sin^6(\theta) + \cos^6(\theta) - 3\cos^4(\theta) = \text{value}\]

Options :
1. \(\times\) 2
2. \(\checkmark\) -2
3. \(\times\) -3
4. \(\times\) 3

Question Number : 76 Question Id : 813561716 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In \(\triangle ABC\), \(\angle A = 90^\circ\) and co-ordinates of points \(B\) and \(C\) are \((2, -4)\) and \((1, 5)\). Then the equation of the circumcircle of \(\triangle ABC\) is

\(\triangle ABC\) \(\angle A = 90^\circ\) \(B, C\) \(B(2, -4), C(1, 5), \triangle ABC\) 

Options :
1. $x^2 + y^2 + 3x + y + 18 = 0$

2. $x^2 + y^2 - 3x + y - 18 = 0$

3. $x^2 + y^2 - 3x - y - 18 = 0$

4. $x^2 + y^2 + 3x - y + 18 = 0$

Question Number : 77 Question Id : 813561717 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the pair of straight line given by $Ax^2 + 2Hxy + By^2 = 0$, where $(H^2 > AB)$, forms an equilateral triangle with the line $ax + by + c = 0$, then $(A + 3B)(3A + B) =$

$Ax^2 + 2Hxy + By^2 = 0$ సరైన రేఖలు నిర్మించిన (ఈది, $H^2 > AB$) ఉద్భవించిన $ax + by + c = 0$ రేఖు నిర్మించిన సమత్యాయానికి ప్రభుత్వం, తీసుకునే $(A + 3B)(3A + B) =$

Options :

1. $4H^2$

2. $-2H^2$

3. $-4H^2$

4. $-4H^2$

Question Number : 78 Question Id : 813561718 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
\[ \int_{0}^{\pi/4} \tan^2(x) \, dx = \]

Options:
1. \( \frac{\pi}{4} \)
2. \( \frac{\pi}{4} - 1 \)
3. \( 1 - \frac{\pi}{4} \)
4. \( 0 \)

Question Number : 79 Question Id : 813561719 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option

Orientation : Vertical
If the equation \( x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0 \) represents a pair of straight lines which are parallel to each other, find the distance between them is

\( x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0 \) మరింత సూధాంచుకుంటే దూరం వాటి మధ్య ఉండతాయో?

Options:
1. 4 units
2. 2 units
Question Number : 80 Question Id : 813561720 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

\[ \left( -i + \sqrt{3} \right)^{300} + \left( -i - \sqrt{3} \right)^{300} = \]

Options :
1. \( 2^{300} \)
2. \( 2^{301} \)
3. \( 2^{100} \)
4. \( -2^{300} \)

Physics

Section Number : 2
Mandatory or Optional : Mandatory
Number of Questions : 40
Number of Questions to be attempted: 40
Section Marks: 40
Display Number Panel: Yes
Group All Questions: Yes
Mark As Answered Required?: Yes

Question Number: 81 Question Id: 813561721 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical

The S.I. unit of length is “meter”. Suppose we adopt a new unit of length which equals x meter. Then, the area of 1 m² expressed in terms of new unit has a magnitude _______

చిత్రాన్ని గుర్తించండి. అనేక దిశాలో ఉండే మాతృరాశి ప్రతి రోట్ 1 మీటర్ పరిమితం పెట్టి చేసేందుకు అనేక దిశాలో ఉండే రోట్ పరిమితం లేకపోయండి?

Options:
1. \( x \)
2. \( x^2 \)
3. \( \frac{1}{x} \)
4. \( \frac{1}{x^2} \)

Question Number: 82 Question Id: 813561722 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical
The central fringe in the interference pattern obtained in Young’s double slit experiment will be a dark fringe when the phase difference between the waves from the two slits is

Options:
1. 0
2. \( \frac{\pi}{2} \)
3. \( \pi \)
4. \( \frac{\pi}{3} \)

Two balls \( X (2 \, kg) \) and \( Y (4 \, kg) \) approach each other with equal speeds of \( 10 \, m. \, s^{-1} \). If the collision is perfectly elastic, the new velocities of \( X \) and \( Y \) balls are respectively

Options:
1. \( \frac{50}{3} \, m. \, s^{-1}, \frac{-10}{3} \, m. \, s^{-1} \)
\[-\frac{50}{3} \text{ m/s}^{-1}, -\frac{10}{3} \text{ m/s}^{-1}\]

3. ✓

\[\frac{50}{3} \text{ m/s}^{-1}, \frac{10}{3} \text{ m/s}^{-1}\]

4. ✗

Question Number : 84 Question Id : 813561724 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The moment of inertia of a rectangular plate of mass \(M\), length \(L\) and breadth \(B\), about an axis passing through its centre and perpendicular to its plane is ______

మాత్రముగా మూడు వంటి వండము ఉండటం వలనే మాత్రము \(M\) వ్యాధిత్రి, \(L\) లేదు, \(B\) లేదు రెండు ప్రాంతస్థలాలు ఉండటం వలనే ______

Options :

1. ✗ \[\frac{M(L+B)}{12}\]

2. ✗ \[\frac{M(L^2)}{12}\]

3. ✓ \[\frac{M(L^2+B^2)}{12}\]

4. ✗ \[\frac{M(B^2)}{12}\]
A train of 150 m length is going towards north direction at a speed of 10 m s\(^{-1}\). A parrot flies at the speed of 5 m s\(^{-1}\) towards south direction parallel to the railway track. The time for which the parrot flies alongside the train is

\[ 150 \text{ m train length} \times 10 \text{ m s}^{-1} \text{ train speed} = 1500 \text{ m s} \text{ parrot flight distance} \]

\[ 5 \text{ m s}^{-1} \text{ parrot speed} \]

\[ 1500 \text{ m parrot flight distance} \times 5 \text{ m s}^{-1} \text{ parrot speed} = 7500 \text{ s parrot flight time} \]

Options:
1. ✗ 12 s
2. ✗ 30 s
3. ✓ 10 s
4. ✗ 5 s

Two identical thin bar magnets, each of length \( l \) and pole strength \( m \), are placed at right angle to each other with north pole of one touching south pole of the other. The magnetic moment of the system is

\[ l \text{ bar length} \times m \text{ pole strength} \]

\[ l \times m \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]

\[ l \times m \text{ magnetic moment} \times \text{ right angle} = \text{ magnetic moment} \]
A charged cork ball having mass $1 \text{ g}$ and charge $'q'$ is suspended on a light string in a uniform electric field as shown in figure. The ball is in equilibrium at $\theta = 37^\circ$, when value of electric field is \( \vec{E} = (3 \hat{i} + 5 \hat{j}) \times 10^5 \text{ N.C}^{-1} \). Assume $T$ as tension in the string. Which of the following options are correct? (given $\sin 37^0 = 0.60$ and $g = 10 \text{ms}^{-2}$)

1. $0.5 \text{ lm}$
2. $\text{ lm}$
3. $2 \text{ lm}$
4. $\sqrt{2} \text{ lm}$

Question Number : 87 Question Id : 813561727 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
1. $q = 11 \times 10^{-8} \, C$

2. $T = 5.55 \times 10^{-3} \, N$

3. $q = 12 \times 10^{-9} \, C$

4. $T = 4.55 \times 10^{-3} \, N$

**Question Number : 88 Question Id : 813561728 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

An automatic gun fires 360 bullets per minute with a speed of 360 kmph. If each bullet weighs 20 g, the power of the gun is

**Question Number : 89 Question Id : 813561729 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option**

Options:

1. $75 \, W$

2. $150 \, W$

3. $300 \, W$

4. $600 \, W$
Wein's displacement law states ______

1. $\lambda_m T = \text{constant}$

2. $\frac{\lambda_m}{T} = \text{constant}$

3. $\frac{r}{\lambda_m} = \text{constant}$

4. $\lambda_m + T = \text{constant}$

Question Number : 90 Question Id : 813561730 Question Type : MCQ Display Question
Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
Orientation : Vertical

Water is flowing through a horizontal pipe in streamline flow. At the narrowest part of the pipe ______

1. Velocity is max and pressure is min

2. वेलोटिज्ड होवलो म्याचन कोहोलो
Pressure is max and velocity is min
2.

Both pressure and velocity are max
3.

Both the velocity and pressure are min
4.

Question Number : 91 Question Id : 813561731 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the wavelength of a photon is 4000 Å, then its energy will be _________

 choix వ్యాప్తి, అంశం ఒకటి అంశం 4000 Å అంశం, తదు ఎంతో?

Options :
1. ✓ 4.95 × 10⁻¹⁹ J

2. × 5.95 × 10⁻¹⁹ J

3. × 3.95 × 10⁻¹⁹ J

4. × 6.95 × 10⁻¹⁹ J

Question Number : 92 Question Id : 813561732 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
Orientation : Vertical

An ideal heat engine has an efficiency $\eta$ the coefficient of performance of the engine when driven backward will be

\[ 1 - \left[ \frac{1}{\eta} \right] \]

Options :

1. $1 - \left[ \frac{1}{\eta} \right]$ 
2. $\eta - \left[ \frac{1}{\eta} \right]$ 
3. $\left[ \frac{1}{\eta} \right] - 1$ 
4. $\frac{1}{1-\eta}$

Question Number : 93 Question Id : 813561733 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A body of mass 5 kg acquires an acceleration of 10 rad. s$^{-2}$ due to an applied torque of 2 Nm. Its radius of gyration is _______

5 kg పాత్ర శాస్త్రంలో 70 మీటర్లు, 2 Nm ప్రమాణం ఉన్నపోయిన వేగా ప్రమాణించబడింది, 10 rad. s$^{-2}$

వీటిని కృషణిప్పడం విచిత్రం. మహమాదన కొట్టడు కుంసి పొదలింది?

Options :

1. $2.5 m$
2. $\sqrt{2.5} m$
3. \( \sqrt{0.2} \text{ m} \)

4. \( 0.2 \text{ m} \)

**Question Number : 94 Question Id : 813561734 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

If \( 100 \text{ N} \) force is applied to \( 10 \text{ kg} \) block as shown in the diagram, the acceleration of \( 40 \text{ kg} \) slab is

\[ \text{acceleration of } 40 \text{ kg slab} = \mu_k \text{g} \]

\[ = 0.6 \times 10 = 0.6 \times 9.8 = 5.88 \text{ m/s}^2 \]

**Options :**

1. \( 1.65 \text{ m/s}^2 \)

2. \( 0.98 \text{ m/s}^2 \)

3. \( 0.5 \text{ m/s}^2 \)

4. \( 0.25 \text{ m/s}^2 \)

**Question Number : 95 Question Id : 813561735 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**
In a rocket, fuel burns at the rate of 1 kg/s. This fuel is ejected from the rocket with a velocity of 60 km/s. The force exerted on the rocket by this is _______.

In a rocket, fuel burns at the rate of 1 kg/s. This fuel is ejected from the rocket with a velocity of 60 km/s. The force exerted on the rocket by this is _______.

Options:

1. 60 N
2. 600 N
3. 6000 N
4. 60000 N

---

Question Number: 96 Question Id: 813561736 Question Type: MCQ Display Question Number: Yes Is Question Mandatory: No Single Line Question Option: No Option Orientation: Vertical

The rate of radiation of a black body at 0 °C is E J.s⁻¹. The rate of radiation of the black body at 273 °C will be _______.

The rate of radiation of a black body at 0 °C is E J.s⁻¹. The rate of radiation of the black body at 273 °C will be _______.

Options:

1. E J.s⁻¹
2. 4E J.s⁻¹
3. \( \frac{E}{2} \) J.s⁻¹
4. $16 \, E \, \text{J.s}^{-1}$

**Question Number : 97** Question Id : 813561737 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If a source is transmitting electromagnetic wave of frequency $8.2 \times 10^6 \, \text{Hz}$, then wavelength of the electromagnetic waves transmitted from the source will be _________

వ్యాప్తి అత్యంత వేగానికి ఉండే విదేశము వైద్యం ప్రవేశించిన $8.2 \times 10^6 \, \text{Hz}$ వెంటను, వాయిది వ్యాప్తి (విదేశం వ్యాప్తి) అత్యంత వెడదితే వైద్యం వైద్యం అవుతుంది.

**Options :**

1. ✔ $36.5 \, \text{m}$

2. ✗ $40.5 \, \text{m}$

3. ✗ $42.3 \, \text{m}$

4. ✗ $50.9 \, \text{m}$

**Question Number : 98** Question Id : 813561738 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The power utilized when a force of $(2 \hat{i} + 3 \hat{j} + 4 \hat{k}) \, \text{N}$ acts on a body for 4 seconds, producing a displacement of $(3 \hat{i} + 4 \hat{j} + 5 \hat{k}) \, \text{m}$, is _________

పోరు వాయిది $(2 \hat{i} + 3 \hat{j} + 4 \hat{k}) \, \text{N}$ వరుణం నిర్మాణం ప్రవేశి మాత్రము ఎంతగా విదేశం ప్రవేశించిన $(3 \hat{i} + 4 \hat{j} + 5 \hat{k}) \, \text{m}$ విదేశం వ్యాప్తి?

AP EAMCET 2020
Question Number : 99
Question Id : 813561739
Question Type : MCQ
Display Question Number : Yes
Is Question Mandatory : No
Single Line Question Option : No
Orientation : Vertical

A copper wire of radius 0.1 mm and resistance 2 kΩ is connected across a power supply of 40 V. The number of electrons transferred per second between the supply and the wire at one end is

Options:
1. ✗ 2.00 × 10^{16}
2. ✓ 1.25 × 10^{17}
3. ✗ 2.85 × 10^{17}
4. ✗ 3.25 × 10^{16}

Question Number : 100
Question Id : 813561740
Question Type : MCQ
Display Question
AP EAMCET 2020
In a thermodynamic process pressure of a fixed mass of a gas is changed in such a manner that the gas releases 30 J of heat and 10 J of work was done on the gas. If the initial internal energy of the gas was 30 J, then the final internal energy will be

Options:
1. ✗ 2 J
2. ✗ 18 J
3. ✔ 10 J
4. ✗ 58 J

A gas is compressed from a volume of 2 m\(^3\) to a volume of 1 m\(^3\) at a constant pressure of 100 N. m\(^{-2}\). Then it is heated at constant volume by supplying 150 J of energy. As a result, the internal energy of the gas ________

Options:
A point mass of 10 kg is placed at the centre of earth. The weight of the point mass is

**Question Number : 102 Question Id : 813561742 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

**Options :**

1. ✓ 250 J

2. ✗ decreases by 250 J

3. ✗ decreases by 50 J

4. ✗ increases by 50 J

A point mass of 10 kg is placed at the centre of earth. The weight of the point mass is

**Question Number : 102 Question Id : 813561742 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

**Options :**

1. ✓ 250 J

2. ✗ 98 N

3. ✗ 49 N

4. ✗ 10 N
Question Number : 103 Question Id : 813561743 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A stone falls freely such that the distance covered by it in the last second of its motion is equal to the distance covered by it in the first 5 seconds. It is in air for _______ seconds

Options :
1. ☒ 12
2. ☒ 13
3. ✗ 25
4. ✗ 26

Question Number : 104 Question Id : 813561744 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The wire of potentiometer has resistance 4 Ω and length 1 m. It is connected to a cell of e.m.f. 2 V and internal resistance 1 Ω. The current flowing through the potentiometer wire is ______

Options :
1. ✗ 0.1 A
Question Number : 105 Question Id : 813561745 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If a pressure of $8 \times 10^8 \text{N.m}^{-2}$ is applied to a lead block so that its volume reduces by 20%. The Bulk modulus of lead block is ________

Options:
1. $4 \times 10^7 \text{N.m}^{-2}$
2. $4 \times 10^8 \text{N.m}^{-2}$
3. $4 \times 10^9 \text{N.m}^{-2}$
4. $4 \times 10^{10} \text{N.m}^{-2}$

Question Number : 106 Question Id : 813561746 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
A shot is fired from a point at a distance of 400 m, from the foot of a tower 100 m high, so that it just passes over it. The direction of shot with respect to the horizontal is:

100 m యొక్క మదన ఉండి గుడ్దు చలించిన మంత్రయ్యే స్థానం 400 m దూరం ఉండి ఉండి మామల్ ఉండి వాసా మామలు బాగా శిఖరం నుండి భాగా కేసరం ఉంటే (క్రమంగా, కూసుమలు) అనేది. అమాలు,

చూసేందుకు ప్రతి మామల పంచబాగా చేయండి.

Options :
1. × 30°
2. × 60°
3. × 70°
4. ✔ 45°

The unit of magnetic induction is ________

మాగిటక సుమారు పదార్థం ________

Options :
1. ✔ Wb m⁻²
2. × Wb m⁻¹
3. × Wb A
4. × Wb
Question Number : 108 Question Id : 813561748 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A 100 V battery is connected across the series combination of the two capacitors of 4 μF and 8 μF. The energy stored in the series combination is ________

Options :
1. $0.75 \times 10^{-2}$ J
2. $1.33 \times 10^{-2}$ J
3. 0.5 J
4. 1 J

Question Number : 109 Question Id : 813561749 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The maximum force acting on a particle executing simple harmonic motion is 10 N. The force on the particle when it is midway between mean and extreme positions will be

Options :
1. 10 N
2. ✗ 12 N
3. ✓ 5 N
4. ✗ 0

Question Number : 110 Question Id : 813561750 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A 0.5 kg block of brass (density = $8 \times 10^3$ kg.m$^{-3}$) is suspended from a string. What is the tension in the string if the block is completely immersed in water? ($g= 10 \ m. \ s^{-2}$)

అం 0.5 kg బ్రాస్స్ బోట్ లో (మూడు = $8 \times 10^3$ kg.m$^{-3}$) సంఖ్యక విశ్రమంలో మాటలే తూర్పును పొందండి. $g= 10 \ m. \ s^{-2}$

Options :
1. ✗ 5 N
2. ✗ $\frac{0.5}{8\times10^3}$ N
3. ✗ $\frac{5}{8}$ N
4. ✓ $\frac{35}{8}$ N

Question Number : 111 Question Id : 813561751 Question Type : MCQ Display Question AP EAMCET 2020
Choose the wrong statement to complete: An ideal solenoid has ________

అయినప్పటి లేదా కనిపించడం లేదా స్థానం: అది నిరోధం కాని ________

Options:

1. the turns widely separated
   సుదీర్ఘం నిరోధం కాంతిభూషణం
   
2. the turns closely wound
   సుదీర్ఘం నిరోధం కాంతిభూషణం
   
3. the length is very much greater than the radius
   అది భారంకని మూడు సాధారణం
   
4. the magnetic field inside almost uniform
   అది నిరోధం కాంతిభూషణం

---

A solid cylinder of mass ‘M’ and radius ‘R’ rolls down an inclined plane of length ‘L’ and height ‘h’, without slipping. Find the speed of its centre of mass when the cylinder reaches its bottom?

‘M’ చికిత్స, ‘R’ లేదా మాత్రము కలిగి ప్రత్యేకం అది ‘L’ నిరోధం, ‘h’ నిరోధం కాని భారం కనున్నాం

భారం భిరాంతి కిందిం చేయండి. అది భారం నిరోధం కాని నపుడు నిరోధం నిద్రాం నిద్రాం

భారం ఎంపిక దాని ఎ ఎంపిక దాని

Options:

1. \( \sqrt{2gh} \)

The minimum horizontal speed with which a body must be projected so that it goes around a smooth vertical circular track of radius 4 m is ________ (\( g = 9.8 \, \text{m/s}^2 \))

Options:
1. \( 7 \, \text{m/s}^{-1} \)
2. \( 14 \, \text{m/s}^{-1} \)
3. \( 0.7 \, \text{m/s}^{-1} \)
4. \( 1.4 \, \text{m/s}^{-1} \)
A body is projected with a velocity greater than orbital velocity but less than escape velocity. Its path is ________

Options:
1. circular
2. elliptical
3. parabolic
4. hyperbolic

Question Number : 115 Question Id : 813561755 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Find the current through the primary coil(P) of the transformer shown below?

Options:
1. 0.08 A
2. 0.04 A
3. 0.02 A
4. 0.01 A

A Zener diode is made by

Options:
1. Heavily doping both p and n sides of a p – n junction diode.

Question Number : 116 Question Id : 813561756 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Heavily doping the $p$ side and lightly doping the $n$ side of a $p-n$ junction diode.

$$\text{lightly doping the } p \text{ side and heavily doping the } n \text{ side of a } p-n \text{ junction diode.}$$

3. ❌

Lightly doping both $p$ and $n$ sides of a $p-n$ junction diode.

$$\text{lightly doping both } p \text{ and } n \text{ sides of a } p-n \text{ junction diode.}$$

4. ❌

**Question Number : 117 Question Id : 813561757 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

The magnitude of induced emf is directly proportional to the rate of change of magnetic flux linked with the coil. This statement is known as ________

3. ❌

**Options :**

1. ❌ Ohm’s law

2. ❌ Lenz’s law

3. ✔ Faraday’s law

4. ❌ Ampere’s law
Question Number : 118 Question Id : 813561758 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

An electric dipole with dipole moment ‘p’ is placed with its axis at 30° to a uniform electric field. The work done in rotating the dipole to a position where its axis is perpendicular to the field is

\[ \frac{2pE}{\sqrt{3}} \]

Options :
1. \( \times \) \( 2pE \)
2. \( \times \) \( \frac{2pE}{\sqrt{3}} \)
3. \( \checkmark \) \( \frac{\sqrt{3}pE}{2} \)
4. \( \times \) 0

Question Number : 119 Question Id : 813561759 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

When a capacitor is connected to a battery __________

\[ \text{అధికరణ మధ్య ఉపయోగ అంచనా} \] __________

Options :
An alternating current flow in the circuit

1. ✗

No current flows in the circuit

2. ✗

A current flow for some time and finally it decreases to zero

3. ✓

Current keeps on increasing and reaches maximum after some time

4. ✗

**Question Number : 120 Question Id : 813561760 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical**

A steel wire of length 20 cm and area of cross section 1 mm² is tied rigidly at both the ends. When the temperature of the wire is changed from 40 °C to 20 °C, find the change in its tension. Given, the coefficient of linear expansion for steel is $1.1 \times 10^{-5} \text{ K}^{-1}$ and young's modulus of steel is $2.0 \times 10^{11} \text{ N.m}^{-2}$.

20 cm విస్తీర్ణం 1 mm² చేస్తోంది పొడవు కు ఎక్కడు ఎక్కడు నిష్టాంపించిన స్టీల్ వైఫియర్ తెలుగు మీదించిన స్టీల్

మిగిలిని తిరఫు యిస్తుంది. ఎందుకంటా పొడవు కంటా 40 °C మరియు 20 °C యే రాష్ట్రాలు తిరిగి ఎందుకంటా షాడికి తిరిగి ఆస్తి లేదా.

స్టీల్ సంఖ్య: $1.1 \times 10^{-5} \text{ K}^{-1}$ రాష్ట్రాలు మరియు సంఖ్య: $2.0 \times 10^{11} \text{ N.m}^{-2}$

**Options :**

1. ✗ 22 N

2. ✓ 44 N
Chemistry

Section Number : 3
Mandatory or Optional : Mandatory
Number of Questions : 40
Number of Questions to be attempted : 40
Section Marks : 40
Display Number Panel : Yes
Group All Questions : Yes
Mark As Answered Required? : Yes

Question Number : 121 Question Id : 813561761 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the Daniel cell, \( Zn \mid Zn^{2+} \parallel Cu^{2+} \parallel Cu \), when an external voltage is applied such that \( E_{\text{external}} > E_{\text{cell}} \), current flows from ______

\( \text{మేము దీనిలో మాత్రం} Zn \mid Zn^{2+} \parallel Cu^{2+} \parallel Cu \) ని ఎక్కడు \( E_{\text{ప్రత్యేకం}} > E_{\text{ప్రత్యేకం}} \) అగస్తులు ఉంటాయి

ఇది మాత్రమే ______

Options :

1. ✔️ Znప్రత్యేకం Cu

2. ✗
Cu to Zn
Cu నిష్పత్తులు Zn

No current flows
ప్రవాహం ఉంది

3. ✗

Data insufficient
ప్రత్యేకించకుండా

4. ✗

Question Number : 122 Question Id : 813561762 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Calculate the energy required to convert all atoms in 4.8 g of Mg to Mg$^{2+}$ in the vapor state. $IE_1$ and $IE_2$ of Mg are 740 kJ/mol and 1450 kJ/mol respectively.

4.8 గ్రామం Mg గా సమూహాలితం వహించడానికి ప్రవాహం ఉంది. Mg ఇంటికి $IE_1$, $IE_2$ విశిష్టాలు 740 kJ/mol మరియు 1450 kJ/mol.

Options :
1. ✗ + 740 kJ/mol

2. ✗ − 740 kJ/mol

3. ✗ − 1450 kJ/mol

4. ✔ + 438 kJ/mol

Question Number : 123 Question Id : 813561763 Question Type : MCQ Display Question
If the binding energy of electrons in a metal is 250 kJ/mol, what should be the threshold frequency of the striking photons in order to free an electron from the metal surface?

Options:
1. $6.26 \times 10^{14} \text{ s}^{-1}$
2. $12.4 \times 10^{14} \text{ s}^{-1}$
3. $6.26 \times 10^{12} \text{ s}^{-1}$
4. $12.4 \times 10^{12} \text{ s}^{-1}$

If $\Delta H > 0$ and $\Delta S > 0$, the reaction can proceed spontaneously at ________

$\Delta H > 0$ మరియు $\Delta S > 0$. ఆ సమీకరణ ప్రకటినప్పటి విధానంలో మీమారి సంభవిస్తుంది?
All temperatures

Will never be spontaneous

Question Number : 125 Question Id : 813561765 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following is an example for Chain-Growth polymer?

Options :

1. Bakelite

2. Teflon

3. Nylon

4. Terylene

Question Number : 126 Question Id : 813561766 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
In an agricultural field, which among the following is the highest producer of methane?

అయితే ఎందుకు మీకు ముందు మలింపు వచ్చి ఉంది?

Options:
1. Wheat crop
2. Paddy crop
3. Cotton crop
4. Groundnut Crop

The molarity of 0.2 \( N \) \( \text{Na}_2\text{CO}_3 \) solution will be

0.2 \( N \) \( \text{Na}_2\text{CO}_3 \) లో మాణం ______

Options:
1. 0.05 \( M \)
2. 0.2 \( M \)
3. 0.1 \( M \)
4. \[0.4 \text{ M}\]

**Question Number : 128** Question Id : 813561768 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of elements among \(O, Cl, F, N, P, Sn, Ti, K, Sc\) which show more than one non-zero oxidation state is

\(O, Cl, F, N, P, Sn, Ti, K, Sc\) మార్గార్థమైనందువల్ల అందిపడట ఉండగా మరియు అందులే ఇతర్సారం ఉంటాయి?

**Options :**
1. \[\text{2}\]
2. \[\text{3}\]
3. \[\checkmark \text{6}\]
4. \[\text{8}\]

**Question Number : 129** Question Id : 813561769 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following represent the structure of methyl hemiacetal of formaldehyde?

మెథిల్ హేమియేస్టాల్ ఫార్మాల్డేహిడ్ మార్గం స్త్రీలు విభిన్నమైనం అంతే విభిన్నం?

**Options :**
1. \[\text{\checkmark} \]
Compound 'A' undergoes formation of cyanohydrins, which on hydrolysis gives lactic acid \((CH_3CHOHCOOH)\). Therefore, compound 'A' is

\[
\begin{align*}
\text{CH}_3 & \quad \text{CH} \\
& \quad \text{OCH}_3
\end{align*}
\]

Options:

1. Formaldehyde
   - ✗

2. ✅
Acetaldehyde

Acetone

Benzaldehyde

Question Number : 131 Question Id : 813561771 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Conc. $HNO_3$ turns brown on standing due to formation of ________

Options :

1. $NO$
2. $NO_2$
3. $N_2O$
4. $N_2O_4$

Question Number : 132 Question Id : 813561772 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Which of the following units is useful in relating concentration of solution with its vapour pressure?

Options:

1. Mole fraction
   - ಮೋಲ ಸಾಂಖ್ಯ

2. Parts per million
   - ಪಾರ್ಟ್ಸ್ ಪ್ರ ಮಿಲಿಯನ್

3. Mass percentage
   - ಪ್ರಮಾಣ ರೈಲ್ಲೆ

4. Molality
   - ಮೊಲಿಟಿ

---

The linear shape of $CO_2$ is due to __________

$CO_2$ ಅದರ ವಿಕೇಂದ್ರ ಭೂಮಿಯ ಲಕ್ಷಣಗಳು __________ ರೂಪಗಳೂ
3. \( p\pi - d\pi \) bonding between carbon and oxygen

4. \( sp^2 \) hybridization of carbon
The pH of $10^{-8} \text{ M } HCl$ solution is

$10^{-8} \text{ M } HCl$ మిశ్రమ సమస్య పై పాయుంది, pH = ____________

Options:

1. ✗ 8
2. ✗ −8
3. ✗ Between 7 – 8
4. ✔ 6 – 7

Between 6 – 7

Question Number : 136 Question Id : 813561776 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Which of the following statements is correct about the cathode rays?

1) These rays start from anode and move towards cathode
2) They are visible with human eye
3) In presence of electric and magnetic fields, they behave like positively charged particles
4) Their characteristic does not depend on the nature of material at electrode

What among the following acts as a vitamin?

1) Can be synthesized in the body
2) Can be obtained from food
3) Essential for human health
4) Not essential for human health

Options:

1. ✗ 1
2. ✗ 2
3. ✗ 3
4. ✓ 4
The charge on colloidal particles is due to _________

Options:

1. Presence of electrolyte

2. Very small size of particles

3. Adsorption of ions from the solution

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Can’t be determined

Question Number : 139 Question Id : 813561779 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

When CaCl₂ is added to AgCl crystal, the defect introduced is

\[ AgCl + \text{CaCl}_2 \rightarrow \text{CaCl}_3 + Ag^+ + Cl^- \]

Options :

1. Frenkel defect only

2. Schottky defect only

3. No change

4. Both Frenkel and Schottky defects

Question Number : 140 Question Id : 813561780 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of hydrogen bonds formed by a water molecule at normal conditions is

\[ H_2O + H_2O \rightarrow H_2O \cdot \cdot \cdot H_2O + H_+ + OH^- \]
Choose the correct option regarding:

**Assertion:** Energy of the orbital decreases with increase of ‘n’

**Reason:** Energy is required in shifting away the negatively charged electron from positively charged nucleus

Options:

1. Assertion and reasoning are correct statements and reason is the correct explanation for assertion.

2. Assertion and reasoning are correct statements and reason is not the explanation for assertion.

3. Assertion is correct, reason is wrong.
Assertion is wrong, reason is correct

Question Number : 142 Question Id : 813561782 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Match the following items of List-I with those of List-II

<table>
<thead>
<tr>
<th>List-I</th>
<th>List-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Nickel</td>
<td>i. Electrolytic refining</td>
</tr>
<tr>
<td>b) Titanium</td>
<td>ii. Zone refining</td>
</tr>
<tr>
<td>c) Germanium</td>
<td>iii. Van Arkel method</td>
</tr>
<tr>
<td>d) Copper</td>
<td>iv. Mond process</td>
</tr>
</tbody>
</table>

1. Nickel
2. Titanium
3. Germanium
4. Copper

List-I

<table>
<thead>
<tr>
<th>List-I</th>
<th>List-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) अगर</td>
<td>i. वृक्षी अगर  जळाहान</td>
</tr>
<tr>
<td>b) श्रीविभ</td>
<td>ii. मोदो श्रीविभ</td>
</tr>
<tr>
<td>c) रक्षितचक्ष</td>
<td>iii. विजय रक्षितचक्ष</td>
</tr>
<tr>
<td>d) रत्न</td>
<td>iv. रत्न  दान</td>
</tr>
</tbody>
</table>

Options:

1. a → (iv),  b → (i),  c → (iii),  d → (ii)

2. a → (iii),  b → (iv),  c → (ii),  d → (i)

3. a → (iv),  b → (iii),  c → (ii),  d → (i)
4. \[ a \rightarrow (ii), \quad b \rightarrow (i), \quad c \rightarrow (iv), \quad d \rightarrow (iii) \]

**Question 143**

**Question Type:** MCQ  
**Display Question Number:** Yes  
**Is Question Mandatory:** No  
**Single Line Question Option:** No  
**Orientation:** Vertical

1-chloro butane on treatment with alcoholic potash forms _______

1-\( \text{CH}_2\text{CH}_2\text{CH}_2\text{Cl} \) നുസ്സാദയിൽ സേവനം നിർത്തുന്നത് എന്താണ് ആയിരം പുള്ളിയായി? _______

**Options:**

1. \( \text{CH}_2\text{CH}_2\text{OH} \)  
2. \( \text{CH}_3\text{CH}_2\text{OH} \)  
3. \( \text{CH}_3\text{CH}_2\text{CH}_2\text{OH} \)  
4. \( \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH} \)  

Question Number : 144 Question Id : 813561784 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
The second ionization energies of Li, Be, B and C are in the order ________

ద్వివిధం లి, బీ, బేరు మద్యం చివ్వాలి జాంటము ప్రమాదం ప్రాంబంపి జాంటం

Options :
1. ✗ Li > C > B > Be
2. ✗ Li > B > C > Be
3. ✗ Be > C > B > Li
4. ✅ B > C > Be > Li

Tincture of iodine is the common name for ________

టిన్టిక్రు ఉడు ఆడాడక ఎలా ఉంటాయం?

Options:
1. ✗ Iodoform
2. ✗ 2-iodopropane
3. ✅ 2-3 % Iodine solution in alcohol-water

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What is the product of the reaction given below?

\[
\text{H}_3\text{C} - \text{C} - \text{Br} \xrightarrow{\text{5N1}} \xrightarrow{\text{C}_2\text{H}_5\text{OH}} ?
\]

**Options:**

1. \[
\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{OC}_2\text{H}_5
\]

2. \[
\text{H}_3\text{C} - \text{C} - \text{CH}_3
\]

3. \[
\text{CH}_3 - \text{CH} - \text{CH} - \text{OC}_2\text{H}_6
\]

4. ✔️

Iodobenzene
Which complex among the following has the highest value of spin only magnetic moment?


**Options:**

1. ✔️ \[[Fe\,(CN)_6]^3-\]

2. ✗ \[[Fe\,(CN)_6]^4-\]

3. ✗ \[[Ni\,(CN)_4]^2-\]

4. ✗ \[[Ni\,Cl_4]^2-\]
Vapour density of a metal chloride is 83. If equivalent weight of the metal is 6, its atomic weight will be _____.

మార్గం ప్రయాణం సమాధానం 83. అప్పుడు చలుపుదిక సమాధానం 6 అంశం, మార్గాన్ని మార్గం హొంది?

Options:
1. ✗ 12
2. ✗ 24
3. ✔ 18
4. ✗ 60

Question Number : 149 Question Id : 813561789 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which factor makes Li the strongest reducing agent in aqueous solution?

అనే సంయోగంలో Li చర్మం సవంతాలో నాలుగు యొక్క సంబంధం ప్రకటించడానికి వారించడము?

Options:
- Sublimation enthalpy
  
  1. ✗

- Ionisation enthalpy
  
  2. ✗

- Hydration Enthalpy
  
  3. ✔
What by-product is formed in the process of making phenol from cumene?

What by-product is formed in the process of making phenol from cumene?

Options:

1. propan-2-ol
2. n-propanol
3. propanal
4. propan-2-one

Question Number : 150 Question Id : 813561790 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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Which of the following is the common oxidation state for ‘transition’ elements?

వక్షాల మాత్రమే భాగానే అయితే పరిస్థితి నిమిత్తం మరింతం?

Options:
1. +3
2. +1
3. +2
4. +4

Which of the following represents disproportionation of potassium chlorate?

వివిధ పరిస్థితులు ఉన్నప్పటికీ మాత్రమే పరిస్థితి మరింతం?

Options:
1. $2 \text{KClO}_3 \rightarrow 2 \text{KCl} + 3 \text{O}_2$
2. $3 \text{KClO}_3 \rightarrow 2 \text{KClO}_2 + \text{KClO}_3$
3. $4 \text{KClO}_3 \rightarrow 3 \text{KClO}_4 + \text{KCl}$
4. $...$
None of the options are correct
సాధనా లేదు

Question Number : 153 Question Id : 813561793 Question Type : MCQ Display Question
Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
Orientation : Vertical

The bond stability of N₂, N₂⁻ and N₂²⁻ varies as:

N₂, N₂⁻, N₂²⁻ యొక్క శాంతీ విశేషాలు తెచ్చు

Options :

1. ✗ N₂ < N₂⁻ < N₂²⁻

2. ✗ N₂⁻ < N₂ < N₂²⁻

3. ✔ N₂²⁻ < N₂⁻ < N₂

4. ✗ N₂⁻ < N₂²⁻ < N₂

Question Number : 154 Question Id : 813561794 Question Type : MCQ Display Question
Number : Yes Is Question Mandatory : No Single Line Question Option : No Option
Orientation : Vertical

Work done by an ideal gas at a constant volume is ______

వేగ సాధనాలు లేదు సాధనా సమీకరణ విషయాలు = ______

Options :
1. \(-\frac{\Delta P}{P}\)

2. \(-V \Delta P\)

3. \(0\)

4. \(-\frac{nR}{P}\)

Question Number : 155 Question Id : 813561795 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which acid among the following has the highest pKₐ value?

Which acid among the following has the highest pKₐ value?

Options :

1. \(HCl\)

2. \(HF\)

3. \(HI\)

4. \(HBr\)

Question Number : 156 Question Id : 813561796 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
The ionic product of water ______, with increase in temperature.

The ionic product of water ______, with increase in temperature.

Options:

1. Remains constant
   - రకిమా దిమిత్తు లేదు

2. Increases
   - వస్తుదులేదు

3. Decreases
   - ఎదురు లేదు

4. May increase or decrease
   - ఎదురు లేదు కొప్పు లేదు

In the extraction of silver, zinc metal is used as a reducing agent. What is the molecular structure of the zinc complex formed in this reaction?

In the extraction of silver, zinc metal is used as a reducing agent. What is the molecular structure of the zinc complex formed in this reaction?

Options:

1. Tetrahedral
   - చతుర్స్పాదం
Which among the following polymers can be formed by using caprolactam monomer unit?

Options:

1. Nylon-6,6

2. Melamine polymer

3. Nylon-6

4. Nylon-2-nylon-6
Question Number : 159 Question Id : 813561799 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Which species among the following doesn’t show disproportionation reactions?

Which species among the following doesn’t show disproportionation reactions?

Options :
1. \( \text{clo}_2^- \)
2. \( \text{clo}_3^- \)
3. \( \text{clo}_4^- \)
4. \( \text{clo}_4^- \)

Question Number : 160 Question Id : 813561800 Question Type : MCQ Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
In the chemical reaction \( A \rightarrow B \), what is the order of the reaction? Given that the rate of reaction doubles if the concentration of \( A \) is increased four times.

In the chemical reaction \( A \rightarrow B \), what is the order of the reaction? Given that the rate of reaction doubles if the concentration of \( A \) is increased four times.

\[ A \rightarrow B \text{ 为何反应速率 } A \text{ 增加 } 4 \text{ 倍时，反应速率会增加 } 2 \text{ 倍。因此，反应的指数是 } \boxed{2} \]

Options :
1. \( 2 \)
2. \( 1.5 \)
3. \( 0.5 \)
4. \[ \text{1} \]