Let $f$ be a function such that $f(xy) = \frac{f(x)}{y}$ for all positive real numbers $x, y$. If $f(20) = 15$, then $f(50) =$

Options:
1. $75$
2. $2$
3. $12$
4. $6$
5. $75$
If \( f : A \rightarrow B \) is a function defined by \( f(x) = \frac{x^2 - x}{x^2 + 2x} \) then, which one of the following is true?

\[
f : A \rightarrow B \quad \text{where} \quad f(x) = \frac{x^2 - x}{x^2 + 2x}
\]

Options:
1. \( A = \mathbb{R} \setminus \{0, -2\}, B = \mathbb{R} \) and \( f(x) \) is decreasing function
2. \( A = \mathbb{R} \setminus \{-2\}, B = \mathbb{R} \setminus \{1\} \) and \( f^{-1}(x) \) is decreasing function
3. \( A = \mathbb{R} \setminus \{0, -2\}, B = \mathbb{R} \setminus \{1\} \) and \( f^{-1}(x) \) is increasing function
4. Both \( f(x) \) and \( f^{-1}(x) \) are increasing functions

The statement \( n^5 - 5n^3 + 4n \) is divisible by 120” is true for

\[
 n^5 - 5n^3 + 4n \quad \text{where} \quad 120 \quad \text{is divisible by} \quad n
\]

Options:
1. \( n = 1 \) only
2. \( n = 10 \) only
\( n = 100 \) only

\( n = 100 \) కొండిని ఆధారం చేస్తుంది

All positive integer values of \( n \)

\( n కొనియుగు రెండు దిగుమతులు వంటివల్లు ఉంటాయి

4.

Question Number : 4  Question Id : 1874634484  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\begin{align*}
\text{Let } A &= \begin{bmatrix} 7 & 5 \\ 4 & 8 \end{bmatrix}, \quad B &= \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix} \quad \text{and } C &= \begin{bmatrix} -5 & 3 \\ 7 & -4 \end{bmatrix}, \\
\text{If } \text{Tr}(S) \text{ denotes the trace of a square matrix } S \text{ then} \\
\sum_{k=0}^{\infty} \frac{1}{3^k} \text{Tr}\left\{ A(BC)^k \right\} =
\end{align*}
\]

\[
\begin{align*}
A &= \begin{bmatrix} 7 & 5 \\ 4 & 8 \end{bmatrix}, \quad B &= \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}, \quad C &= \begin{bmatrix} -5 & 3 \\ 7 & -4 \end{bmatrix}, \\
\text{If } \text{Tr}(S) \text{ denotes the trace of a square matrix } S \text{ then} \\
\sum_{k=0}^{\infty} \frac{1}{3^k} \text{Tr}\left\{ A(BC)^k \right\} =
\end{align*}
\]

Options :

1. \( \frac{45}{2} \)

2. \( 36 \)

3. \( \frac{81}{2} \)

4. \( 9 \)
If the inverse of the matrix \( A = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 8 \\ 5 & -2 & 7 \end{bmatrix} \) is \( B \) then \( B^T = \)

\[
A = \begin{bmatrix} 3 & 4 & 5 \\ 2 & -1 & 8 \\ 5 & -2 & 7 \end{bmatrix}
\]

Options:

1. \[
\frac{1}{136} \begin{bmatrix} 9 & 26 & 1 \\ -38 & -4 & 26 \\ 37 & -14 & -11 \end{bmatrix}
\]

2. \[
\frac{1}{136} \begin{bmatrix} 9 & -38 & 37 \\ 26 & -4 & -14 \\ 1 & 26 & -11 \end{bmatrix}
\]

3. \[
\frac{1}{136} \begin{bmatrix} 9 & 26 & 1 \\ 37 & -14 & -11 \\ -38 & -4 & 26 \end{bmatrix}
\]

4. \[
\frac{1}{136} \begin{bmatrix} 9 & 1 & 26 \\ -38 & 26 & -4 \\ 37 & -11 & -14 \end{bmatrix}
\]

If \( x = \alpha, y = \beta, z = \gamma \) is the solution of the system of equations \( x + y + z = 4, 2x - y + 3z = 9, 3x + y + 2z = 8 \), then \( 4\alpha + 2\beta + 3\gamma = \)

\[x + y + z = 4, 2x - y + 3z = 9, 3x + y + 2z = 8 \quad \text{and} \quad \frac{4}{3} \alpha + \frac{2}{3} \beta + \frac{3}{3} \gamma = \]

Options:
Question Number : 7  Question Id : 1874634487  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\left( \frac{2}{i + \sqrt{3}} \right)^{100} + \left( \frac{2}{i - \sqrt{3}} \right)^{100}
\]

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

Question Number : 8  Question Id : 1874634488  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( z \) is a complex number such that \( \left| z - \frac{6}{z} \right| = 5 \), then the maximum value of \( |z| \) is

\[ \text{选项:} \begin{align*}
1. 3 \\
2. 2 \\
3. 1 \\
4. 4
\end{align*} \]
Question Number : 9  Question Id : 1874634489  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(a = 3 + 4i\), \(Z_1\) and \(Z_2\) are two complex numbers such that \(|Z_1| = 3\) and \(|Z_2 - a| = 2\), then the maximum value of \(|Z_1 - Z_2|\) is

\[a = 3 + 4i, \quad Z_1 \text{ and } Z_2 \text{ such that } |Z_1| = 3, |Z_2 - a| = 2\]

Options :

1. 5
2. 10
3. 15
4. 20

Question Number : 10  Question Id : 1874634490  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(\alpha\) is the real root and \(\beta, \gamma\) are the complex roots of the equation \(x^3 + 3x^2 + 3x + 28 = 0\) then \(2\alpha + 3\beta + 3\gamma = \)

\[x^3 + 3x^2 + 3x + 28 = 0\]

Options :

1. -5
2. 0
3. 5
4. -23

Question Number : 11  Question Id : 1874634491  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Given that \( \alpha, \beta, \gamma, \delta \) are in a geometric progression. If \( \alpha, \beta \) are the roots of \( x^2 - x + p = 0 \) and \( \gamma, \delta \) are the roots of \( x^2 - 4x + q = 0 \), where \( p \) and \( q \) are integers, then the ordered pair \((p, q) = \) \( \alpha, \beta, \gamma, \delta \) are in geometric progression. Let's denote \( \alpha, \beta \) as the roots of \( x^2 - x + p = 0 \) and \( \gamma, \delta \) as the roots of \( x^2 - 4x + q = 0 \). Then, \( p, q \) are integers. Thus, the ordered pair \((p, q) = \)

Options:

1. \((2, 32)\)
2. \((-2, -32)\)
3. \((2, -32)\)
4. \((-2, 32)\)

If \( A, B, C \) are the sets of all values of \( x \) for which \( x^2 - 5x - 14 \) is positive, \(-6x^2 + 2x - 3\) is negative and \( 4x - 5x^2 + 2 \) is positive respectively, then \( A \cap B \cap C = \)

\( x^2 - 5x - 14 \) is positive for \(-6x^2 + 2x - 3\) is negative and \( 4x - 5x^2 + 2 \) is positive respectively. Thus, \( A, B, C \) are the sets, then \( A \cap B \cap C = \)

Options:

1. \((-2, 7)\)
2. \(\emptyset\)
3. \(\left(\frac{2 - \sqrt{14}}{5}, \frac{2 + \sqrt{14}}{5}\right)\)
4. \(\mathbb{R}\)
The complete solution set of the inequation $\sqrt{x^2 - 3x + 2} > (3 - x)$ is

$\sqrt{x^2 - 3x + 2} > (3 - x)$ కాబట్టి సమాధానాలు మినగు కోసం లింగం

Options :
1. $\left(\frac{7}{3}, 3\right]$
2. $(3, \infty)$
3. $(-\infty, 1] \cup [2, \infty)$
4. $\left(\frac{7}{3}, \infty\right)$

The greatest real root of the equation $6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0$ is

$6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0$ కాబట్టి సమాధానాలు మినగు కోసం లింగం

Options :
1. 2
2. 5
3. 2
4. 3
5. 2

The greatest real root of the equation $6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0$ is

$6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0$ కాబట్టి సమాధానాలు మినగు కోసం లింగం
I: The number of all ten digit numbers that can be formed with all the distinct digits and which are divisible by 4 is $15 \times 8!$.

II: The number of positive integers that can be formed by using the digits 0, 1, 2, 3, 4, 5 without any repetition is 1630.

Options:
1. Only I is true
2. Only II is true
3. Both I and II are true
4. Both I and II are false
If the coefficients of \( r^{th}, (r+1)^{th} \) and \( (r+2)^{th} \) terms in the expansion of \( (1 + x)^{14} \) are in an arithmetic progression, then \( r = \) 

\[(1 + x)^{14} = \text{coefficient of } r, (r+1) \text{ and } (r+2) \text{ terms} \]

Options:
1. 4 or 10
2. 8 or 6
3. 5 or 9
4. 7

If \( x = \frac{5}{2!} + \frac{5 \cdot 7}{3! \cdot 2^2} + \frac{5 \cdot 7 \cdot 9}{4! \cdot 3^3} + \ldots \), then \( x^2 + 4x = \)

\[x = \frac{5}{2!} + \frac{5 \cdot 7}{3! \cdot 2^2} + \frac{5 \cdot 7 \cdot 9}{4! \cdot 3^3} + \ldots \]

Options:
The coefficient of $x^3$ in the expansion of \( \frac{x}{(x+1)(x-2)^2} \) is

\[ \frac{x}{(x+1)(x-2)^2} \]

Options:
1. \( \frac{9}{48} \)
2. \( \frac{15}{48} \)
3. \( \frac{77}{324} \)
4. \( \frac{15}{16} \)
If the periods of the functions \( \sin(\alpha x + b) \) and \( \tan(\alpha x + d) \) are respectively \( \frac{4}{7} \) and \( \frac{2}{5} \), then

\[
\sin(|a| + |c|) + \cos(|a| - |c|) =
\]

\[
\sin(\alpha x + b) \quad \text{and} \quad \tan(\alpha x + d) \quad \text{are} \quad \text{in} \quad \text{degree} \quad \text{If} \quad \frac{4}{7} \quad \text{and} \quad \frac{2}{5} \quad \text{are}.
\]

\[
n \sin(|a| + |c|) + \cos(|a| - |c|) =
\]

Options :
1. \(-1\)
2. \(0\)
3. \(1\)
4. \(2\)

Question Number : 21  Question Id : 1874634501  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The smallest positive value of \( x \) (in degrees) for which

\[
\tan(x + 100^\circ) = \tan(x + 50^\circ) \cdot \tan x \cdot \tan(x - 50^\circ)
\]

is

\[
\tan(x + 100^\circ) = \tan(x + 50^\circ) \cdot \tan x \cdot \tan(x - 50^\circ) \quad \text{is} \quad \text{in} \quad \text{degree} \quad \text{and} \quad \text{degree} \quad \text{is}
\]

Options :
1. \(25\)
2. \(82 \frac{1}{2}\)
3. \(55\)
4. \(30\)
For $\alpha \neq 0$, if $\cos(\theta + \alpha), \cos \theta$ and $\cos(\theta - \alpha)$ are in harmonic progression, then

$$\sec^2 \theta \cdot \cos^2 \frac{\alpha}{2} =$$

$\alpha \neq 0$ so, $\cos(\theta + \alpha), \cos \theta$ and $\cos(\theta - \alpha)$ are in harmonic progression,

$$\sec^2 \theta \cdot \cos^2 \frac{\alpha}{2} =$$

Options:

1. $2$

2. $1$

3. $\frac{1}{2}$

4. $\frac{1}{4}$

---

If $\cos 2\theta + \alpha \sin \theta = 2\alpha - 7$ has a solution, then

$$\cos 2\theta + \alpha \sin \theta = 2\alpha - 7$$

Options:

1. $\alpha \in [-2, 4]$

2. $\alpha \in [-6, -2]$

3. $\alpha \in [6, 8]$

4. $\alpha \in [2, 6]$
If \( x = a \) is a solution of the equation \( \sin^{-1} \frac{x}{3} + \sin^{-1} \frac{2x}{3} = \sin^{-1} \), then the roots of the equation \( x^2 - ax - 1 = 0 \) are

\[
\sin^{-1} \frac{x}{3} + \sin^{-1} \frac{2x}{3} = \sin^{-1} \quad \text{where} \quad x = a \quad \text{and} \quad x^2 - ax - 1 = 0
\]

Options:
1. \( \pm 1 \)
2. \( \frac{1}{2}, 1 \)
3. \( \pm \frac{1}{2} \)
4. \( -\frac{1}{2}, 1 \)

The set of all real values of \( x \) for which

\[
f(x) = \log_e \sqrt{\frac{1+x}{1-x}} + \log_e \left( \frac{1+\sqrt{1-x^2}}{x} \right) + \cot h^{-1} x + \log_e \left( \frac{1+\sqrt{1+x^2}}{x} \right) + \sin h^{-1} x
\]

is defined is

Options:
1. \( \emptyset \)
2. \( (0, 1) \)
3. \((-1, 1)\)

4. \((0, 1]\)

Question Number: 26  Question Id: 1874634506  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

In a triangle ABC, if the angle \(A = 60^\circ\), then \(\frac{1}{a+b} + \frac{1}{a+c} = \)

And అంతేంచి ABC త్రిభుజం A = 60° తో హెచ్ హెచ్ \(\frac{1}{a+b} + \frac{1}{a+c} = \)

Options:
1. \(\frac{3(1+b-c)}{a+b+c}\)
2. \(\frac{2}{a+b+c}\)
3. \(\frac{3}{a+b+c}\)
4. \(\frac{a+b+c}{3a^2}\)

Question Number: 27  Question Id: 1874634507  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

In \(\Delta ABC\), \(8R^3\sum \sin^3 A \cos (B - C) = \)

And \(\Delta ABC\) ఏ కంటే \(8R^3\sum \sin^3 A \cos (B - C) = \)

Options:
1. \(abc\)
2. \(4abc\)
3. \( 3 \text{ R } \Delta \)

4. \( 12 \text{ R } \Delta \)

**Question Number : 28  Question Id : 1874634508  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a \( \Delta ABC \), if \( a : b : c = 4 : 5 : 6 \), then the ratio of the radius of the circum circle to the radius of the incircle is

\[ \frac{a}{\Delta ABC}, \ a:b:c=4:5:6 \text{ తెలుసు, } \text{ సమీయం సురితిత్వసేధంతుంటాయి,} \text{ అందుచే సురితిత్వసేధంతుంటాయి కొనా నంభితుంటుంది} \]

**Options :**

1. 13 : 7

2. 15 : 7

3. 16 : 7

4. 17 : 9

**Question Number : 29  Question Id : 1874634509  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

\( \vec{a}, \vec{b}, \vec{c} \) are three mutually perpendicular unit vectors in the right handed system. If the points P, Q, R with position vectors \( 2\vec{a} + 5\vec{b} - 4\vec{c} \), \( \vec{a} + 4\vec{b} - 3\vec{c} \) and \( k\vec{a} + 7\vec{b} - 6\vec{c} \) respectively lie on a line, then, the ratio in which the point P divides QR is

\[ \vec{a}, \vec{b}, \vec{c} \text{ అవుతున్న మూడు సంఖ్యాలు అనేక సంఖ్యాలు ఉంటాయి కాని అది ఎంతం సంఖ్యాలు ఉంటాయి.} \text{ 2\vec{a} + 5\vec{b} - 4\vec{c},} \text{ \( \vec{a} + 4\vec{b} - 3\vec{c} \) మూడు సంఖ్యాలు ఉంటాయి \text{ కాని P, Q, R అనే మూడు సంఖ్యాలు ఉంటాయి} \text{ అందుచే అది ఎంతం సంఖ్యాలు ఉంటాయి} \text{ కాని P విభజించే అది ఎంతం సంఖ్యాలు ఉంటాయి} \]

**Options :**

1. 1 : 2

2. -1 : 3
Let \( \mathbf{\pi} \) be the plane passing through the points \( \mathbf{i}, \mathbf{j}, \mathbf{i} + \mathbf{j} + \mathbf{k} \) and \( \mathbf{L} \) be the line passing through the point \( \mathbf{i} + 2\mathbf{j} + 3\mathbf{k} \) and parallel to the vector \( \mathbf{i} - \mathbf{j} + \mathbf{k} \). If \( P(\alpha, \beta, \gamma) \) is the point of intersection of the plane \( \mathbf{\pi} \) and the line \( \mathbf{L} \), then, \( \sqrt{(\alpha^2 + \beta^2)} = \)

\[ \pi \text{ (}\mathbf{i}, \mathbf{j}, \mathbf{i} + \mathbf{j} + \mathbf{k} \text{) and } \mathbf{L} \text{ (}\mathbf{i} + 2\mathbf{j} + 3\mathbf{k} \text{) parallel } \mathbf{i} - \mathbf{j} + \mathbf{k} \text{, then } P(\alpha, \beta, \gamma) \text{ is the point of intersection of } \mathbf{\pi} \text{ and } \mathbf{L}, \sqrt{(\alpha^2 + \beta^2)} = \]

Options:
1. 0
2. 1
3. 6
4. \( \sqrt{14} \)

If \( \mathbf{a} = \mathbf{i} - \mathbf{j} - \mathbf{k}, \mathbf{b} = 2\mathbf{i} - 3\mathbf{j} + \mathbf{k} \) and \( \mathbf{p}_1, \mathbf{p}_2 \) are the orthogonal projection vectors of \( \mathbf{a} \) on \( \mathbf{b} \) and \( \mathbf{a} \) on \( \mathbf{b} \) respectively, then \( (\mathbf{p}_1 + \mathbf{p}_2) \cdot (\mathbf{p}_1 - \mathbf{p}_2) = \)

\[ \mathbf{a} = \mathbf{i} - \mathbf{j} - \mathbf{k}, \mathbf{b} = 2\mathbf{i} - 3\mathbf{j} + \mathbf{k} \text{ and } \mathbf{p}_1, \mathbf{p}_2 \text{ are the orthogonal projection vectors of } \mathbf{a} \text{ on } \mathbf{b} \text{ and } \mathbf{a} \text{ on } \mathbf{b} \text{ respectively, then } (\mathbf{p}_1 + \mathbf{p}_2) \cdot (\mathbf{p}_1 - \mathbf{p}_2) = \]

Options:
Let \( \mathbf{a}, \mathbf{b}, \mathbf{c} \) be three non-coplanar vectors and \( \mathbf{a}' = \frac{\mathbf{b} \times \mathbf{c}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]}, \quad \mathbf{b}' = \frac{\mathbf{c} \times \mathbf{a}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]}, \quad \mathbf{c}' = \frac{\mathbf{a} \times \mathbf{b}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]} \).

The length of the altitude of the parallelopiped formed by \( \mathbf{a}', \mathbf{b}', \mathbf{c}' \) as coterminal edges, with respect to the base having \( \mathbf{a}' \) and \( \mathbf{c}' \) as its adjacent sides is

\[
\mathbf{a}, \mathbf{b}, \mathbf{c} \text{ అయితే విశేషాలు నిర్మాణం చేయడానికి ప్రతిష్ఠా వికాసం } \mathbf{a}' = \frac{\mathbf{b} \times \mathbf{c}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]}, \quad \mathbf{b}' = \frac{\mathbf{c} \times \mathbf{a}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]}, \quad \mathbf{c}' = \frac{\mathbf{a} \times \mathbf{b}}{[\mathbf{a} \cdot \mathbf{b} \cdot \mathbf{c}]}
\]

అభిప్రాయం. \( \mathbf{a}', \mathbf{b}', \mathbf{c}' \) సాధ్యంగా చేయడానికి సాధారణం మేరకు విస్తరించడానికి \( \mathbf{a}', \mathbf{c}' \) సాధ్యం మేరకు విస్తరించడానికి సాధారణం

Options:

1. \( |\mathbf{a}| \)
2. \( \frac{1}{|\mathbf{b}|} \)
3. \( |\mathbf{c}| \)
4. \[ \frac{1}{|\vec{a} \times \vec{c}|} \]

Question Number : 33  Question Id : 1874634513  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let \( \vec{a}, \ \vec{b}, \ \vec{c} \) be three non-coplanar vectors. Let \( S_i \) \((i = 1, 2, 3, 4, 5, 6)\) denote the six scalar triple products formed by all possible permutations of \( \vec{a}, \ \vec{b}, \ \vec{c} \). If \( i, j, k, l \) are randomly chosen distinct numbers from 1 to 6 and if \( x = \frac{S_i}{S_j} + \frac{S_k}{S_l}, \ y = \frac{S_i}{S_j} - \frac{S_k}{S_l} \) then \( x^2 + y^2 = \)

\[ \vec{a}, \ \vec{b}, \ \vec{c} \] అంటే నాలుగు వెక్టర్లు సాధారణ సమన్యాన్ని నిర్మించడం. \( \vec{a}, \ \vec{b}, \ \vec{c} \) అంటే సాధారణ సమన్యాన్ని నిర్మించడం. \( S_i \) \((i = 1, 2, 3, 4, 5, 6)\) అనే రాశిలో నిర్మించడం. 
\( i, j, k, l \) అనే నాలుగు వెక్టర్లు సాధారణ సమన్యాన్ని నిర్మించడం. 
\[ x = \frac{S_i}{S_j} + \frac{S_k}{S_l}, \ y = \frac{S_i}{S_j} - \frac{S_k}{S_l} \] అనే రాశిలో నిర్మించడం.

Options :
1. 1
2. 4
3. 8
4. 2

Question Number : 34  Question Id : 1874634514  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \vec{a} = \vec{i} - 2\vec{j} + \vec{k}, \ \vec{b} = \vec{i} + 3\vec{j} - 2\vec{k}, \ \vec{c} = 2\vec{i} + \vec{j} - \vec{k} \) and \( \vec{d} = \vec{i} + \vec{j} + \vec{k} \) then the volume (in cubic units) of the tetrahedron having \((\vec{a} \times \vec{b}) \times \vec{c}, \ \vec{b}, \ \vec{d} \) as its coterminal edges is

\[ \vec{a} = \vec{i} - 2\vec{j} + \vec{k}, \ \vec{b} = \vec{i} + 3\vec{j} - 2\vec{k}, \ \vec{c} = 2\vec{i} + \vec{j} - \vec{k} \] అంటే \( \vec{a} = \vec{i} - 2\vec{j} + \vec{k}, \ \vec{b} = \vec{i} + 3\vec{j} - 2\vec{k}, \ \vec{c} = 2\vec{i} + \vec{j} - \vec{k} \) అనేది \( \vec{d} = \vec{i} + \vec{j} + \vec{k} \) అంటే

\[ (\vec{a} \times \vec{b}) \times \vec{c}, \ \vec{b}, \ \vec{d} \] అంటే ప్రతిభా రాశిలో నిర్మించడం కా వెక్టర్లు వెక్టర్లు నిర్మించడం.

Options :
The mean deviation of the data 3, 5, 11, 13, 17, 19, 23, 29 about its arithmetic mean is

3, 5, 11, 13, 17, 19, 23, 29 దిశాసృష్టి మధ్యమం సాధారణ ఆధారం లేదు నియమ శాహనా

Options:
1. 8.5
2. 8
3. 7.2
4. 7

If the weights of 10 persons (in kgs) are observed as: 45, 49, 55, 50, 41, 44, 60, 58, 53, 55 then, the variance of their weights is

10 పిల్లల పరిశీలన వర్గాధిక్య (క్షార.పరిశీలన) 45, 49, 55, 50, 41, 44, 60, 58, 53, 55 ని పరిశీలించి,

Options:
1. 51
2. 42.8
If two dice are rolled at a time, then the probability of getting an odd number on the first die or a total of 7 on both dice is

Options:

1. \( \frac{5}{9} \)
2. \( \frac{2}{3} \)
3. \( \frac{1}{12} \)
4. \( \frac{7}{12} \)

If \( A \) and \( B \) are two events of a random experiment such that \( P(\overline{A}) = 0.3 \), \( P(B) = 0.4 \) and \( P(A \cap \overline{B}) = 0.5 \), then \( P(A \cup B) + P(B | A \cup \overline{B}) = \)

Options:

1. 0.95
A speaks truth in 4 out of 5 times. A die is tossed. If A reports that there is 4 on the die, then the probability that there was 4 on the die, is

\[
\begin{align*}
\text{Options:} & \quad \frac{2}{3} \\
1. & \quad \frac{4}{9} \\
2. & \quad \frac{1}{3} \\
3. & \quad \frac{2}{9}
\end{align*}
\]
Let $S = \{1, 2, 3, \ldots, 50\}$ and $A_k$ be the set of multiples of $k$ in $S$ for $k \in \mathbb{N}$. If $x_k$ is a number chosen from $A_k$, then match the items of List - I with the items of List - II.

$S = \{1, 2, 3, \ldots, 50\}$  మాత్రమే $k \in \mathbb{N}$ అంటే $A_k$ అనేది $S$ లో $k$ మచను, కాని వాటిని అంతాగా ఎమిటేసి అంటేవి. $x_k$ అనేది $A_k$ అనేది ఒకి విలువతో రాయబడిన సంఖ్యను, సిద్ధాంత - I తరువాత ఒకటైనా, సిద్ధాంత - II తరువాత ఒకటైనా ఇటువంటిది.

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) $P(x_3 &lt; 30)$</td>
<td>I) $\frac{1}{2}$</td>
</tr>
<tr>
<td>B) $P(15 &lt; x_4 \leq 36)$</td>
<td>II) $\frac{2}{3}$</td>
</tr>
<tr>
<td>C) $P(x_7 &gt; 35)$</td>
<td>III) $\frac{2}{7}$</td>
</tr>
<tr>
<td>D) $P(x_{11} &gt; 11)$</td>
<td>IV) $\frac{1}{4}$</td>
</tr>
</tbody>
</table>

The correct match is

Options:

1. A B C D
   VI I IV V

2. A B C D
   III I VI V

3. A B C D
   II V I IV
If $X$ is a Poisson variate such that $P(X = 2) = 9 P(X = 4) + 90 P(X = 6)$, then the ordered pair $(\text{Mean}(X), \text{Variance}(X)) =$

Options:
1. $(1, 2)$
2. $(1, 1)$
3. $(2, 1)$
4. $(2, 2)$

If the points $A \left(0, \frac{4}{3}\right), B(-1, 0)$ and $C(1, 0)$ are such that the distance from a point $P$ to the line $BC$ is equal to the geometric mean of the distances from $P$ to the lines $AB$ and $AC$, then the point $P$ lies on the curve

$P$ శిశు ప్రతి రెండు వ్యాసానికి $BC$ ను విభజించి, $P$ ఒకే రెండు వ్యాసానికి $AB$ మరియు $AC$ విభజించి ఉన్నా, త్యా సమతాయ కొరకు కొద్ది అదే $A \left(0, \frac{4}{3}\right), B(-1, 0), C(1, 0)$ విభజించి $\text{P}$ ఒకే రెండు వ్యాసానికి ఉన్నా

Options:
1. $x^2 + y^2 + 3y - 2 = 0$
2. $x^2 - y^2 + 12y - 8 = 0$
3. \[ 2(x^2 + y^2) + 4x + 7 = 0 \]

4. \[ 2(x^2 + y^2) + 3y - 2 = 0 \]

Question Number : 43  Question Id : 1874634523  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let P be the point (4, 1) and Q be its image in the line \( y = x \). If Q is translated through a distance 2 units along the negative Y-axis to reach the point R, then the co-ordinates of R are

\[ P \text{ యొక్కుడు } (4, 1) \text{ అంటే, } \text{ పైషిత్తు యొక్కుడు } y = x \text{ తో పేరుగా Q అంటే యొక్కుడు. అంటే Q యొక్కుడు R చేయడం ద్వారా అంటునీ Y-రోతి రోట్టు పదార్థ రోట్టు సంఖ్య ఉంటుంది. అంటే R యొక్కుడు} \]

Options :
1. \((-1, 2)\)
2. \((1, -2)\)
3. \((-1, -2)\)
4. \((1, 2)\)

Question Number : 44  Question Id : 1874634524  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The normal form of the line \( x + y + 1 = 0 \) is

\[ x + y + 1 = 0 \text{ యొక్కుడు } \text{ అంటునీ మాదిరి మాదిరి} \]

Options :
1. \[ x \cos(45^\circ) + y \sin(135^\circ) = \frac{1}{\sqrt{2}} \]
2. \[ x \cos(45^\circ) + y \sin(45^\circ) = \frac{1}{\sqrt{2}} \]
3. \[ x \cos(225^\circ) + y \sin(225^\circ) = \frac{1}{\sqrt{2}} \]

4. \[ x \cos(45^\circ) + y \sin(45^\circ) = -\frac{1}{\sqrt{2}} \]

**Question Number : 45  Question Id : 1874634525  Question Type : MCQ  Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The vertices of a triangle OBC are O(0, 0), B(−3, −1) and C(−1, −3). If the line joining the point D on OC and E on OB is parallel to BC and the perpendicular distance of O from DE is \( \frac{1}{2} \), then the equation of DE is

\[ \text{OBC విభాగాలు తీసినపోయిన విభాగాలు O(0, 0), B(−3, −1) మరియు C(−1, −3). OC లో D దిగుమానం, OB లో E దిగుమానం సాధారణం BC లో వంటి జత కలిగి ఉంటుందను అనుసరించి O తో DE లో దిగుమానం \( \frac{1}{2} \) లేదా DE తీసి ఉంటుందనూ}.

**Options :**

1. \[ x + y + \sqrt{2} = 0 \]

2. \[ 2x + 2y - \sqrt{2} = 0 \]

3. \[ 2x + 2y + \sqrt{2} = 0 \]

4. \[ 2x - 2y + \sqrt{2} = 0 \]

**Question Number : 46  Question Id : 1874634526  Question Type : MCQ  Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A variable line passing through the fixed point \((\alpha, \beta)\) intersects the co-ordinate axes at A and B. If O is the origin, then the locus of the centroid of the triangle OAB is

\[ \text{ఒప్పందం వైంది వ్యాపారం (\alpha, \beta) లతో సంపందం అయితే అహ్మత్తు అందా కర్తవ్యం A మరియు B ద్వారా వ్యాపారం సంపందం చేయాలి. O తోటాత్తు సంపందం అయితే, OAB లోటాశాం. అందువల్ల భూమిఖండ రేఖలు సంపందం అయితే}.

**Options :**
\[ \beta x + \alpha y = 3xy \]

1.

\[ \alpha x + \beta y = 3xy \]

2.

\[ \alpha x - \beta y = 3xy \]

3.

\[ \beta x - \alpha y = 3xy \]

4.

Question Number : 47  Question Id : 1874634527  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If A is the orthocentre of the triangle formed by \( 2x^2 - y^2 = 0 \), \( x + y - 1 = 0 \) and B is the centroid of the triangle formed by \( 2x^2 - 5xy + 2y^2 = 0 \), \( 7x - 2y - 12 = 0 \), then the distance between A and B is

\[ 2x^2 - y^2 = 0, \ x + y - 1 = 0 \text{ అనే రేఖలాన్ని కూలిన త్రిభుజం యిందే } \]
\[ 2x^2 - 5xy + 2y^2 = 0, \ 7x - 2y - 12 = 0 \text{ అనే రేఖలాన్ని కూలిన త్రిభుజం యిందే } \]

A అనే కోణక B యొక్క దూరం

Options :

1. \( \sqrt{5} \)

2.

5

3. \( \sqrt{2} \)

4.

Question Number : 48  Question Id : 1874634528  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The distance between the pair of lines represented by \( x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0 \) is

\[ x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0 \text{ అనే రేఖల యొక్క దూరం కూడా} \]

Options :
Question Number : 49  Question Id : 1874634529  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The number of integers \( \alpha \), for which a chord of the circle \( x^2 + y^2 = 75 \) is bisected at \((8, \alpha)\) and that the slope of the chord is an integer, is

\[ x^2 + y^2 = 75 \text{ రేఖ ఐరేఖాను ఉంది, (8, \alpha) మిగిలిన గోయాలు ఉంటుంది, ఇందులో పరవసరం తెలుగు అంశాలు ఉంటాయి} \]

Options :

1. 10
2. 8
3. 4
4. 3

Question Number : 50  Question Id : 1874634530  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the line \( x - 6y - 12 = 0 \) meets the circle \( S = x^2 + y^2 - 4x + 8y + 6 = 0 \) at \( A \) and \( B \), then the point of intersection of the tangents at \( A \) and \( B \) to \( S = 0 \) is

\[ x - 6y - 12 = 0 \text{ రేఖ ఐరేఖాను ఉంది, } S = x^2 + y^2 - 4x + 8y + 6 = 0 \text{ రేఖ ఐరేఖాను } A, B \text{ మిగిలిన గోయాలు ఉంటాయి,} \]

\[ A \text{ మిగిలిన } B \text{ మిగిలిన } S = 0 \text{ రేఖ ఐరేఖాను ఉంటాయి} \]

Options :

1. \((1, 2)\)
2. (2, 1)
3. (−1, 2)
4. (2, −1)

Question Number : 51  Question Id : 1874634531  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A circle of radius 5 units passes through A(−5, 0) and B(5, 0). If P(5 cos α, 5 sin α), Q(5 cos β, 5 sin β) are two points on this circle such that \( α - β = \frac{\pi}{2} \), then the locus of the point of intersection of the lines AP and BQ is

\[ x^2 + y^2 - 10x - 25 = 0 \]
1.
\[ x^2 + y^2 + 10x - 25 = 0 \]
2.
\[ x^2 + y^2 + 10y - 25 = 0 \]
3.
\[ x^2 + y^2 - 10y - 25 = 0 \]
4.

Question Number : 52  Question Id : 1874634532  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Two circles which cut each other orthogonally, pass through the points \((a, 0)\) and \((-a, 0)\). If both of them touch the line \(y = mx + c\), then \(c^2 = \)

\[ \text{సర్థి వేసిన దశధాతియ విస్తార తో నుండి నిష్పత్తి} \ (a, 0), \ (-a, 0) \ లో నిష్ప నిష్పత్తి. \ \text{మరియు నిష్ప} \ y = mx + c \text{తో నిష్పత్తి, అంకాం} \ c^2 = \]

Options :
1. \( a^2 + m^2 \)

2. \( a^2(1 + m)^2 \)

3. \( a^2(1 + m^2) \)

4. \( a^2(1 + 2m^2) \)

For the system of circles given by \( (x^2 + y^2 + 2gx) + \lambda (x^2 + y^2 + 2fy + k) = 0 \), where \( g \neq 0, f \neq 0 \) and \( \lambda \) is a parameter, if the line joining the point circles of the system subtends a right angle at the origin, then \( \frac{k}{f^2} = \)

\( g \neq 0, f \neq 0 \) లేదా హాని లేదా హానింట దిగితాలు, \( (x^2 + y^2 + 2gx) + \lambda (x^2 + y^2 + 2fy + k) = 0 \) మొదటి ప్రత్యేకంగా కొనివంం విధంగా ఉంటుంది, అంటే \( \frac{k}{f^2} = \)

Options:

1. \(-1\)

2. \(1\)

3. \(2\)

4. \(\frac{1}{2}\)
For the parabola \( y^2 + 2x + 2y - 3 = 0 \) match the items in List - I with those from List - II.

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Vertex</td>
<td>I) ( 2x - 5 = 0 )</td>
</tr>
<tr>
<td>B) Focus</td>
<td>II) ( \left( \frac{3}{2}, -1 \right) )</td>
</tr>
<tr>
<td>C) Equation of the Directrix</td>
<td>III) ( x - 2 = 0 )</td>
</tr>
<tr>
<td>D) Equation of the Axis</td>
<td>IV) ( y + 1 = 0 )</td>
</tr>
<tr>
<td></td>
<td>V) ( (2, -1) )</td>
</tr>
<tr>
<td></td>
<td>VI) ( \left( 2, \frac{3}{2} \right) )</td>
</tr>
</tbody>
</table>

The correct match is

Options:

1. A B C D
   V VI I III
2. A B C D
   V II I IV
3. A B C D
   VI V IV I
The area (in sq.units) of the triangle formed by the normal to the parabola \( y^2 = 16x \) whose slope is \( \frac{1}{2} \) with the co-ordinates axes is

\[ \text{మరింతంగా \( y^2 = 16x \) యొక్క నలుపంగా \( \frac{1}{2} \) పరాభవం రేఖలు నిర్ధిష్ఠ నిర్ధిష్ఠ రేఖలు నుండి వస్తుంటే \( \text{మరింతం నిర్ధిష్ఠ రేఖలు} \)} \]

Options:

1. \( \frac{9}{4} \)
2. \( \frac{27}{4} \)
3. \( \frac{54}{4} \)
4. \( \frac{81}{4} \)
If the major axis of an ellipse lies on the Y-axis, its minor axis lies on the X-axis and the length of its latus rectum is equal to \( \frac{2}{3} \) of its minor axis, then the eccentricity of that ellipse is

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

Options:

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

If \( y = x + c \) is a normal to the ellipse \( \frac{x^2}{25} + \frac{y^2}{9} = 1 \), then \( c^2 = \)

\[ \frac{x^2}{25} + \frac{y^2}{9} = 1 \Rightarrow y = x + c \text{ అశాస्त్ర తీసుకుంటుంది} \Rightarrow c^2 = \]

Options:

1. \( \frac{128}{17} \)
2. \( \frac{17}{128} \)
The area (in sq. units) of the quadrilateral formed by the four common tangents drawn to the two hyperbolas \( \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 \) and \( \frac{y^2}{a^2} - \frac{x^2}{b^2} = 1 \) \((a > b)\) is

\[
\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 \quad \text{and} \quad \frac{y^2}{a^2} - \frac{x^2}{b^2} = 1 \quad (a > b)
\]

Options:

1. \( a^2 - b^2 \)

2. \( 2(a^2 - b^2) \)

3. \( \frac{a^2 - b^2}{\sqrt{2}} \)

4. \( \frac{a^2 - b^2}{2} \)

The direction cosines of the line which is perpendicular to the lines with direction cosines proportional to \( (1, -2, -2) \) and \( (0, 2, 1) \) are

\((1, -2, -2), (0, 2, 1)\) గా విలయింది అంటే మేండు చిక్కను విస్తరించడం కావచ్చు మేము మేము మేము విస్తరించడం

Options:
1. \[\frac{2}{3}, \frac{-2}{3}, \frac{1}{3}\]
2. \[\frac{2}{3}, \frac{-1}{3}, \frac{-2}{3}\]
3. \[\frac{2}{3}, \frac{-1}{3}, \frac{2}{3}\]
4. \[\frac{2}{3}, \frac{2}{3}, \frac{-1}{3}\]

The number of lines passing through (0, 0, 0) and making an angle of 45° with each of the three co-ordinate axes is

Options:
1. 0
2. 2
3. 4
4. 8

The equation of the plane which passes through the point (2, 5, -8) and perpendicular to each of the planes \(2x - 3y + 4z + 1 = 0\) and \(4x + y - 2z + 6 = 0\) is

Options:
Question Number : 62  Question Id : 1874634542  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical

\[ \lim_{x \to \frac{\pi}{6}} \frac{\sin\left(x - \frac{\pi}{6}\right)}{\sqrt{3} - \cos x} = \]

Options :

1. 0
2. 1
3. 2
4. \frac{1}{2}

Question Number : 63  Question Id : 1874634543  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical

The positive integer \( n \) for which \( \lim_{x \to 0} \frac{(\cos x - 1)(\cos x - e^x)}{x^n} \) exists and is finite, is

\[ \lim_{x \to 0} \frac{(\cos x - 1)(\cos x - e^x)}{x^n} \]

Options :

1. 4
If \( f(x) = \int_{-1}^{x} |t| \, dt, \ x \geq -1, \) then

\[ x \geq -1 \implies f(x) = \int_{-1}^{x} |t| \, dt \]  

**Options:**

1. both \( f \) and \( f' \) are continuous for all \( x > -1 \)
2. \( f \) is continuous for \( x > -1 \) but \( f' \) is not continuous.
3. \( f \) and \( f' \) are differentiable at \( x = 0 \)

---

Question Number : 65  Question Id : 1874634545  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \( x = \sinh^{-1}\left[ \log(1 + \sqrt{y}) \right] \), then \( \frac{dy}{dx} = \)

\[
x = \sinh^{-1}\left[ \log(1 + \sqrt{y}) \right] \quad \Rightarrow \quad \frac{dy}{dx} = \\
2\left(y + \sqrt{y}\right) \cosh x
\]

**Options:**
1. \(2\left(y + \sqrt{y}\right) \sinh x\)
2. \(2\left(y + \sqrt{y}\right) \sqrt{1 - \left(\log(1 + \sqrt{y})\right)^2}\)
3. \(2\left(y + \sqrt{y}\right) \cosh x\)
4. \(2\left(y + \sqrt{y}\right) \log(1 + \sqrt{y})\)

---

If \( f(x) = \frac{(7x + 1) \sin x}{e^x \log x} \) and \( f'(x) = f(x) g(x) \), then \( g'(x) = \)

\[
f(x) = \frac{(7x + 1) \sin x}{e^x \log x} \quad \Rightarrow \quad f'(x) = f(x) g(x) \quad \Rightarrow \quad g'(x) =
\]

**Options:**
1. \(\frac{1}{x^2 \log x} + \frac{1}{(x \log x)^2} - \csc^2 x - \frac{49}{(7x + 1)^2}\)
2. \(\frac{1}{x^2 \log x} + \frac{1}{\log x} - \csc^2 x - \frac{49}{(7x + 1)^2}\)
3. \(\frac{1}{(x \log x)^2} + \frac{x}{\log x} - \csc^2 x - \frac{49}{(7x + 1)^2}\)
\[
\frac{1}{x^2 \log x} + \frac{1}{(x \log x)^2} + \csc^2 x + \frac{49}{(7x + 1)^2}
\]

Question Number : 67  Question Id : 1874634547  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\text{If } f(x) = \frac{1}{9} \begin{vmatrix} \cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix}, \text{ then } \frac{d^2 f}{dx^2} = 
\]

\[
f(x) = \frac{1}{9} \begin{vmatrix} \cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix} \text{ 选项是: } \frac{d^2 f}{dx^2} = 
\]

Options :
1. \(\cos 3x\)
2. \(\cos (\pi + 3x)\)
3. \(\sin 3x\)
4. \(\sin (\pi + 3x)\)

Question Number : 68  Question Id : 1874634548  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The angle between the curves \(y^2 = 8(x + 4)\) and \(y^2 = 24(4 - x)\) is

\(y^2 = 8(x + 4)\) 和 \(y^2 = 24(4 - x)\) 之间的角为

Options :
1. \(\tan^{-1} \left( \frac{1}{6} \right)\)
2. \(\tan^{-1} (3)\)
The function \( f(x) = x^{1/x} \) for \( x > 0 \), is

\[ x > 0 \Leftrightarrow f(x) = x^{1/x} \text{ is increasing or decreasing} \]

Options:

1. increasing in \((1, \infty)\)
   
   \((1, \infty)\) శేషంలో ప్రత్యేకించడం

2. decreasing in \((1, \infty)\)
   
   \((1, \infty)\) అదీ కారకంలో భాగం

3. increasing in \((1, e)\) and decreasing in \((e, \infty)\)
   
   \((1, e)\) అదీ కారకంలో భాగం, \((e, \infty)\) అదీ కారకంలో భాగం

4. decreasing in \((1, e)\) and increasing in \((e, \infty)\)
   
   \((1, e)\) అదీ కారకంలో భాగం, \((e, \infty)\) అదీ కారకంలో భాగం
Let \( f : \left[ 0, \frac{1}{2} \right] \rightarrow \mathbb{R} \) be given by \( f(x) = x(x-1)(x-2) \). The value ‘c’, when Lagrange’s mean-value theorem is applied for \( f(x) \), is

\[
f : \left[ 0, \frac{1}{2} \right] \rightarrow \mathbb{R} \quad f(x) = x(x-1)(x-2) 
\]

Options:

\[\frac{\sqrt{21}}{6}\]  
1.

\[\frac{1}{6}\]  
2.

\[1 - \frac{\sqrt{21}}{6}\]  
3.

\[1 + \frac{\sqrt{21}}{6}\]  
4.

If a tangent to the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) \((a > b > 0)\) having slope \( \frac{1}{3} \) is a normal to the circle \( x^2 + y^2 + 2x + 2y + 1 = 0 \), then the maximum value of \( ab \) is

\[
\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \quad \text{having slope} \quad \frac{1}{3} \text{ is a normal to the circle } x^2 + y^2 + 2x + 2y + 1 = 0
\]

Options:

\[\frac{2}{3}\]  
1.
Question Number : 72  Question Id : 1874634552  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int \frac{\sin^8 x - \cos^8 x}{1 - 2 \sin^2 x + 2 \sin^4 x} \, dx = \]

Options :
1. \(-\frac{1}{2} \sin 2x + c\)
2. \(-\sin 2x + c\)
3. \(\frac{1}{2} \sin 2x + c\)
4. \(\sin 2x + c\)

Question Number : 73  Question Id : 1874634553  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int \frac{2x^{12} + 5x^9}{\left(1 + x^3 + x^5\right)^3} \, dx = \]

Options :
1. \(\frac{x^8}{\left(1 + x^3 + x^5\right)^2} + c\)
\[
\frac{x^{10}}{(1 + x^3 + x^5)^2} + c
\]

3.
\[
\frac{x^{10}}{2(1 + x^3 + x^5)^2} + c
\]

4.
\[
\frac{x^{8}}{2(1 + x^3 + x^5)^2} + c
\]

Question Number : 74  Question Id : 1874634554  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

Options :
1. \( \cot x + \tan^{-1}x + c \)
2. \( \cot x - \tan^{-1}x + c \)
3. \( -\cot x + \tan^{-1}x + c \)
4. \( -\cot x - \tan^{-1}x + c \)

Question Number : 75  Question Id : 1874634555  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( I_n = \int \sin^n x \, dx \) for \( n = 1, 2, 3, \ldots \) then \( 8 \, I_8 + 7( I_7 - I_6) - 6 \, I_5 = \)

\( n = 1, 2, 3, \ldots \) \( \Rightarrow I_n = \int \sin^n x \, dx \)  \( \Rightarrow 8 \, I_8 + 7( I_7 - I_6) - 6 \, I_5 = \)

Options :
1. \( -\sin^6 x \cos x(1 + \sin x) + c \)
\[
\sin^8 x \cos x + \sin^5 x \cos x + c
\]

\[
-\sin^7 x \cos x (1 - \sin x) + c
\]

\[
-\cos^7 x \sin x (1 + \cos x) + c
\]

\[
\lim_{n \to \infty} \frac{1+32+243+\ldots+n^5}{n^6} =
\]

Options:

1. \(\frac{1}{5}\)

2. \(\frac{1}{11}\)

3. \(\frac{1}{6}\)

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

---

Let \(a > 1\) and \(b > 1\). If \(f(t)\) is a periodic function of period \(T\) and

\[
\int_0^\infty a^{-bt} f(t) \, dt = k \int_0^T a^{-bt} f(t) \, dt, \text{ then } k =
\]

\(a > 1, \ b > 1\)  f(t)  අංකිකයි. \(f(t)\) අංකික \(T\) අංකිකයි අංකික උස අංකික කැණා යාවයි.

\[
\int_0^\infty a^{-bt} f(t) \, dt = k \int_0^T a^{-bt} f(t) \, dt \ අංකික, \ k =
\]

Options:
\[
\frac{a^bT}{T+1}
\]

\[
\frac{a^{-bT}}{a^{-bT}+1}
\]

\[
\frac{a^bT}{b^aT+1}
\]

\[
\frac{a^bT}{a^bT-1}
\]

Question Number : 78  Question Id : 1874634558  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The area (in square units) enclosed by the curves \( y = \sin x + \cos x \) and \( y = |\cos x - \sin x| \) over the interval \( \left[ 0, \frac{\pi}{2} \right] \) is

\[
\int_0^{\frac{\pi}{2}} (\sin x + \cos x - |\cos x - \sin x|) \, dx
\]

Options :

1. \( 4 + 2\sqrt{2} \)

2. \( 4 - 2\sqrt{2} \)

3. \( 2 + 2\sqrt{3} \)

4. \( 6 - 3\sqrt{2} \)

Question Number : 79  Question Id : 1874634559  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The degree and order respectively of the differential equation of the family of the curves represented by \( y = \sqrt{c(x + \sqrt{c})} \) are

(Here \( c \) is a parameter)

\[ y = \sqrt{c(x + \sqrt{c})} \] is the equation of the family of curves. The degree and order of this equation are determined as follows:

(Where \( c \) is a parameter)

Options:

1. 1, 3
2. 2, 3
3. 3, 1
4. 2, 2

The solution of the differential equation \( \frac{x + y - 1}{x + y - 2} \frac{dy}{dx} = \frac{x + y + 1}{x + y + 2} \), given that \( y = 1 \) when \( x = 1 \), is

\[ x = 1 \text{ and } y = 1 \text{ satisfy the equation} \] \( \frac{x + y - 1}{x + y - 2} \frac{dy}{dx} = \frac{x + y + 1}{x + y + 2} \) is

Options:

1. \( 2(y - x) + \log \left| \frac{(x + y)^2 - 2}{2} \right| = 0 \)
2. \( \log \left| \frac{(x + y)^2 - 2}{2} \right| = (x - y)^2 \)
If 'A' represents density, 'B' represents velocity, 'C' represents specific heat capacity and 'D' represents wavelength, then the quantity having the dimensions of product of A, B, C and D is

'A' దయకత, 'B' విచారం, 'C' ప్రత్యేక జీవకత యేషట్లుగా ఉంటూ 'D' నియంత్రణ నామం,
A, B, C అంశాలు D ని దయకత యేషట్లుగా ఉంటాం

Options:

1. Stefan's constant
2. Boltzmann constant
3. Thermal conductivity
4. Universal gas constant
A ball dropped from a building of height 12 m falls on a slab of 1 m height from the ground and makes a perfect elastic collision. Later the ball falls on a wooden table of height 0.5 m, makes inelastic collision and falls on the ground. If the coefficient of restitution between the ball and the table is 0.5, then the velocity of the ball while touching the ground is about (Acceleration due to gravity = 10 m/s²)

12 m పడిన పిల్లి లేదు పొడికి ఉంటుంది అయితే 1 m పడిన పిల్లి చాహి. పొడిలో తెలుగు తూర్పులో లేదా పొడిలో తెలు ప్రమాణం కను. 0.5 m పడిన పిల్లి బండి పాలన అధిధార పూర్వ కోసం లేదా పొడిలో తెలు ప్రమాణం కను. పొడిలో, పొడిలో తెలుగు తూర్పులో కను. 0.5 m పడిన పిల్లి బండి పాలన అధిధార (పంచందు గ్రామం = 10 m/s²)

Options:
1. 15.5 m/s⁻¹
2. 14.5 m/s⁻¹
3. 9.2 m/s⁻¹
4. 8.2 m/s⁻¹
Two food packets are thrown with same velocity in the same direction with different angles of projection simultaneously. The angle of projection of one packet is $15^\circ$. At the same moment one boy starts running from rest from the point of projection with an acceleration of $10 \text{ ms}^{-2}$ to catch them. If he caught one packet at a distance of $20 \text{ m}$ and other packet in $\frac{1}{2} \text{s}$ later the first packet, then the angle of projection of the second packet is

(Acceleration due to gravity = $10 \text{ ms}^{-2}$)

Options:

1. $\frac{1}{2} \sin^{-1} \left( \frac{25}{32} \right)$

2. $\frac{1}{2} \sin^{-1} \left( \frac{8}{9} \right)$

3. $\frac{1}{2} \sin^{-1} \left( \frac{7}{8} \right)$

4. $\frac{1}{2} \sin^{-1} \left( \frac{5}{6} \right)$
A body is projected up a smooth inclined plane of length $20\sqrt{2}$ m from point A as shown in the figure. The top (B) of the inclined plane is connected to a well of diameter 40 m. If the body just manages to cross the well then the velocity of projection is (Acceleration due to gravity = 10 ms$^{-2}$)

$$20\sqrt{2} \text{ m}$$

Options :

1. $40 \text{ ms}^{-1}$
2. $40\sqrt{2} \text{ ms}^{-1}$
3. $20 \text{ ms}^{-1}$
4. $20\sqrt{2} \text{ ms}^{-1}$

A body is acted on by a force given by $F = (15 + 3t^2)$ N. The impulse received by the body during the first 2 seconds is

$$\text{Options :}$$
A body starts sliding down from the top of an inclined plane inclined at an angle $\theta$ with horizontal. The first one third of the incline is smooth, the next one third has coefficient of friction $\frac{\mu}{2}$ and the last one third has coefficient of friction $\mu$. If the body comes to rest at the bottom of the plane then the value of $\mu$ is

\[ \frac{\tan \theta}{2} \]

Options:

1. \[ \frac{3 \tan \theta}{2} \]
2. \[ \tan \theta \]
3. \[ 2 \tan \theta \]
A motor pumps a liquid of density $\rho$ through a pipe of cross sectional area $A$. If the liquid moves with a speed $v$ in this pipe, then the rate of kinetic energy imparted to the liquid is proportional to

\[ \text{rate} \propto \rho A v^2 \]

Options:
1. $v^2$
2. $v^3$
3. $v^4$
4. $\sqrt{v}$

Two particles 1 and 2 are allowed to descend on two frictionless chords OP and OQ as shown in figure. The ratio of the speeds of the particles 1 and 2 respectively when they reach the circumference is

\[ \frac{v_1}{v_2} \]

Options:
A uniform rod of mass \( m \) and length \( l \) is pivoted smoothly at \( O \) as shown in figure. If a horizontal force \( F \) acts at the bottom of the rod and \( \omega \) is the angular velocity of the rod which is a function of angle of rotation \( \theta \), then the maximum angular displacement of the rod is

(Acceleration due to gravity = \( g \))

\[ \theta = 2 \sin^{-1} \left( \frac{2F}{mg} \right) \]

Options:

1. \( \frac{1}{2} \)
2. \( \frac{2}{1} \)
3. \( \frac{3}{2} \)
4. \( \frac{2}{3} \)
\[
\theta = 2 \cos^{-1} \left( \frac{2F}{mg} \right)
\]

2.

\[
\theta = 2 \tan^{-1} \left( \frac{2F}{mg} \right)
\]

3.

\[
\theta = 2 \cot^{-1} \left( \frac{2F}{mg} \right)
\]

4.

An electric motor of power 75 W rotates a flywheel of moment of inertia 0.36 kg m\(^2\) at a constant rate of 100 rad s\(^{-1}\). If the power is switched off, the time taken for the wheel to come to rest is

75 W వనాంతం సాశ్రమ విద్యుత్ మాధ్యమం ఉపయోగించి 0.36 kg m\(^2\) వంధయాంతర విద్యుత్ బడిడము కా అంటే మాధ్యమం 100 rad s\(^{-1}\) సాశ్రమం లేకుండా ఎందుకంతా వంధయాంతర విద్యుత్ బడిడము. వనాంతం సాశ్రమం ఉపయోగించి, అది మాధ్యమం అభిప్రచేయి ఎందుకంతా వంధయాంతర విద్యుత్ బడిడము

Options:
1. 12 s
2. 24 s
3. 36 s
4. 48 s
A particle is executing simple harmonic motion along a straight line PQ. At three points A, B and C on the line PQ, lying on one side of the mean position, the velocities of the particle are 8 ms\(^{-1}\), 7 ms\(^{-1}\) and 4 ms\(^{-1}\) respectively. If AB = BC = 1 m, the velocity of the particle at mean position is

Options:
1. 9 ms\(^{-1}\)
2. \(\sqrt{47}\) ms\(^{-1}\)
3. \(\sqrt{65}\) ms\(^{-1}\)
4. 10 ms\(^{-1}\)

The gravitational potential difference between the surface of a planet and a point 20 m above it is 16 J kg\(^{-1}\). The work done in moving a 4 kg body by 8 m on a slope of 60° from the horizontal is

Options:
1. 22.17 J
2. 2.217 J
3. 221.7 J
The area of cross-section of steel wire is 0.1 cm\(^2\) and Young's modulus of steel is \(2 \times 10^{11}\) N m\(^{-2}\). The force required to stretch by 0.1% of its length is

\[\text{force} = \text{area} \times \text{modulus} \times \text{strain} \]

Options:

1. 1000 N
2. 2000 N
3. 5000 N
4. 4000 N

A sphere of radius \(R\) has a concentric spherical cavity of radius \(r\). The relative density of the material of the sphere is \(\sigma\). It just floats when placed in tank full of water. The value of \(\frac{R}{r}\) is

\[\frac{R}{r} = \left(\frac{\sigma}{\sigma - 1}\right)^{\frac{1}{3}}\]

Options:

1. \(\left(\frac{\sigma}{\sigma - 1}\right)^{\frac{1}{3}}\)
Figure shows a system of two concentric spheres of radii $r_1$ and $r_2$ at temperatures $T_1$ and $T_2$ respectively. The radial rate of flow of heat in a substance filled between the two concentric spheres is proportional to

$$
\left(\frac{\sigma-1}{\sigma}\right)^{\frac{1}{3}}
$$

$$
\left(\frac{\sigma}{\sigma-1}\right)^{\frac{1}{2}}
$$

$$
\left(\frac{\sigma-1}{\sigma}\right)^{\frac{1}{2}}
$$

Options:

1. $r_2 - r_1$

2. $\ln\left(\frac{r_2}{r_1}\right)$
A composite bar of uniform cross section is made of 25 cm of Copper, 10 cm of Nickel and 15 cm of Aluminium with perfect thermal contacts. The free Copper end of the rod is at 100 °C and the free Aluminium end is at 0 °C. If \( K_{Cu} = 2 \) \( K_{Al} \) and \( K_{Al} = 3 \) \( K_{Ni} \), then the temperatures of Cu-Ni and Ni-Al junctions are respectively (Assume no loss of heat occurs from the sides of the rod, \( K \)-thermal conductivity)

Options:

1. 82.3 °C, 31.3 °C
2. 78.3 °C, 26.1 °C
3. 70 °C, 23.3 °C
4. 90.3 °C, 30.1 °C
The specific heat capacities of three liquids A, B and C are in the ratio 1:2:3 and the masses of the liquids are in the ratio 1:1:1. The temperatures of the liquids A, B and C are 15 °C, 30 °C and 45 °C respectively. Then match the resultant temperature of the mixture given in list-II with the corresponding mixture given in list-I.


<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Mixture of liquids A and B</td>
<td>I) 25 °C</td>
</tr>
<tr>
<td>A మరియు B కంప్రేషన్స్</td>
<td></td>
</tr>
<tr>
<td>B) Mixture of liquids B and C</td>
<td>II) 35 °C</td>
</tr>
<tr>
<td>B మరియు C కంప్రేషన్స్</td>
<td></td>
</tr>
<tr>
<td>C) Mixture of liquids C and A</td>
<td>III) 37.5 °C</td>
</tr>
<tr>
<td>C మరియు A కంప్రేషన్స్</td>
<td></td>
</tr>
<tr>
<td>D) Mixture of liquids A, B and C</td>
<td>IV) 39 °C</td>
</tr>
<tr>
<td>A, B మరియు C కంప్రేషన్స్</td>
<td></td>
</tr>
</tbody>
</table>

The correct answer is

ఎంపిక పదార్థం

Options:

1. A B C D
   I II III IV

2. A B C D
   II I IV III

3. A B C D
   I IV III II
4. A gas ($\gamma = 1.5$) undergoes a cycle of adiabatic, isobaric and isochoric processes in an order. If the volume of the gas is doubled in the adiabatic process then the efficiency of the cycle is approximately

Options:
1. 18%
2. 46.4%
3. 38.5%
4. 9.25%

5. The $y$-components of velocities of the molecules of a gas are $-7, -6, -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6, +7 \text{ m/s}$ then the rms velocity is

Options:
$\sqrt{\frac{56}{3}} \text{ m/s}$
A metal wire of length 80 cm, area of cross-section 3 mm$^2$ and material density 3000 kg m$^{-3}$ is joined to another metal wire of length 60 cm, area of cross-section 1 mm$^2$ and material density 9000 kg m$^{-3}$. The free ends of the two wires are stretched between two rigid supports and a tension of 40 N is produced in the wires. The minimum frequency of the tuning fork which can produce stationary waves with the joint of the wires as a node is

\[ \sqrt{\frac{28}{3}} \text{ ms}^{-1} \]

\[ \sqrt{\frac{112}{3}} \text{ ms}^{-1} \]

\[ \sqrt{\frac{84}{3}} \text{ ms}^{-1} \]

Question Number : 100  Question Id : 1874634580  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Options :

1. \( \frac{200}{3} \) Hz

2. \( \frac{400}{3} \) Hz

3. \( \frac{500}{3} \) Hz
4. A source producing sound of frequency 720 Hz is falling freely from the top of a tower of height 20 m. The frequency of sound heard by an observer on the top of the tower when the source just reaches the ground is

\[ \frac{700}{3} \text{ Hz} \]

(Acceleration due to gravity = 10 m/s\(^2\) and speed of sound in air = 340 m/s\(^{-1}\))

Options:
1. 660 Hz
2. 680 Hz
3. 740 Hz
4. 760 Hz

---

4. In a spherical glass marble of radius 6 cm, a small air bubble is formed at 1 cm from the centre of the marble. The apparent position of the air bubble from the nearest point on the surface of the marble is about

(Refractive index of glass is 1.5)

Options:
In Young’s double slit experiment, the two slits are separated by 0.5 cm and the screen is at 0.5 m from the slits. If 20000 bright fringes are counted per meter on the screen, then the wavelength of light used is

Options:
1. 5000 Å
2. 5890 Å
3. 6000 Å
4. 5460 Å

A dipole has two charges +1 μC and −1 μC and each of mass 1 kg. The separation between the charges is 1 m. An electric field $20 \times 10^3$ Vm$^{-1}$ is applied on the dipole. If the dipole is deflected through 2° from equilibrium position, then the time taken by it to come to equilibrium position again is

Options:
In the following four cases, charged particles are at equal distances from the origin. Arrange them in the descending order of magnitude of the net electric field at the origin.

Options:
1. a, b, c, d
2. b, a, c, d
3. a, c, b, d
A capacitance of 2 \( \mu \text{F} \) is required in an electrical circuit across a potential of 1.0 kV. A large number of 1 \( \mu \text{F} \) capacitors are available which can withstand a potential difference of not more than 300 V. The minimum number of capacitors required to achieve this is

\[ 10 \text{ kV} \div 300 \text{ V} = 33.33 \text{ nm} \times 2 \mu \text{F} = 66.67 \mu \text{F} \]

Options:
1. 24
2. 32
3. 8
4. 16

A charge ‘5 C’ is placed at the centre of shell of radius \( r = 3 \text{ m} \) and having charge ‘5 C’. The potential at a point \( \frac{r}{2} \) distance from the centre of the shell will be

\[ \frac{q}{4\pi\varepsilon_0 r} \]

Options:
1. \( -9 \times 10^9 \text{ V} \)
2. \( 30 \times 10^9 \text{ V} \)
3. \( 45 \times 10^9 \text{ V} \)
Question Number : 108  Question Id : 1874634588  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Electrical energy costs 25 paisa per kilowatt hour. Assuming that no energy is wasted, the cost of heating 4.6 kg of water from 25 °C to the boiling point is

Options:
1. 25 paisa
2. 25 చిన్నెలు
3. 50 paisa
4. 50 చిన్నెలు

Question Number : 109  Question Id : 1874634589  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A 500 W heater is designed to operate at 200 V potential difference. If it is connected across 160 V line, the heat it will produce in 20 minute is

Options:
1. 384 kJ
A wire of length 44 cm carrying a current of 2 A is bent and the two ends are joined. This shape is placed in a uniform magnetic field of 50 mT. If the magnetic field is in north-south direction, then the maximum torque acting on the shape is

\[ 2 \text{ A} \times 50 \text{ mT} \times 44 \text{ cm} \times \sin 90^\circ = 2 \times 50 \times 44 \times 10^{-3} \times 10^{-3} \text{ Nm} \]

Options:
1. \[ 1.54 \times 10^{-3} \text{ Nm} \]
2. \[ 0.77 \times 10^{-3} \text{ Nm} \]
3. \[ 3.08 \times 10^{-3} \text{ Nm} \]
4. Zero
A toroid has a non-ferromagnetic core of inner radius 20.5 cm and outer radius 21.5 cm, around which 4200 turns of a wire are wound. If the current in the wire is 10 A, the magnetic field inside the core of the toroid is

\( \mu_0 = 4\pi \times 10^{-7} \text{ Hm}^{-1} \)

20.5 cm లో చెవులు ముందు 21.5 cm లో చెవులు ముందు నుండి రేగానీ అందించేందుకు సంఖ్య 4200 త్రికోణుడు రాయబడింది. రేగా విలువు వంటివేసే సంఖ్య 10 A నుండి రేగా సంఖ్య నిశ్చితం చేయబడింది

\( \mu_0 = 4\pi \times 10^{-7} \text{ Hm}^{-1} \)

Options :
1. 20 mT
2. 40 mT
3. 20 \pi \text{ mT}
4. 40 \pi \text{ mT}

Question Number : 112  Question Id : 1874634592  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Two short bar magnets A and B are arranged coaxially. The distance between their centres is 30 cm. A compass needle placed on their axis at a distance of 6 cm from B shows no deflection. The ratio of the magnetic moments of A and B is

ఎత్తుక తీస్తుంది, మాత్రమే అందించినంత జాతి మద్యంలో బండలు A మరియి B నుండి మిడించాయి. ఎందుకంటే 30 cm B మరియి 6 cm కంటే మద్యంలో అంతించినంత కంటే ఇంతించాయి. A మరియి B నుండి మిడించినంత అంతించినంత రేగా విలువు ప్రమాణం

Options :
1. 16:1
2. 1:16
3. 64:1
A circular coil of area 0.1 m² having 200 turns is placed in a magnetic field of 40 T. The plane of the coil makes 30° with the field. If the field is removed for 0.1 s then the induced emf in the coil is

200 केंद्राय वांछित 0.1 m² समांतर को जोड़ घटाया तो क्षेत्र 40 T अवरोध के साथ 30° से विचलित। अवरोध के एक 0.1 s धीरे से क्षोभ के फैलाव के रूप में जोड़ा जा सकता है। इससे अर्थाते जोड़ के अवरोध के एक 0.1 s क्षीणी जोड़ के एक 0.1 s ।

Options:
1. 4000 V
2. $4000\sqrt{3}$ V
3. 2000 V
4. $2000\sqrt{3}$ V

A coil has an inductance 0.7 H and it is joined in series with a resistance of 220 Ω. When ac of 220 V, 50 Hz is applied to it, then wattless component in the circuit is

0.7 H वांछित है जो 220 H अवरोध के साथ उपस्थित है। अंतर 220 V, 50 Hz एच के उपस्थित है। इसके एक 0.7 H ।

Options:
1. 5 A
2. 0.5 A
3. 0.7 A
A plane electromagnetic wave propagating in a non-magnetic dielectric medium is given by \( E = E_0 \left[ 4 \times 10^{-7} x - 50t \right] \) where ‘x’ is in metre and ‘t’ is in second. If the relative permeability of the medium, \( \mu_r = 1 \) then the dielectric constant of the medium is

\[
\text{Options:}
\begin{align*}
1 & 2.42 \\
2 & 5.76 \\
3 & 8.26 \\
4 & 4.84
\end{align*}
\]

All electrons ejected from a metal surface by the incident light of wavelength 200 nm can be stopped before travelling 1 m in the direction of uniform electric field of 4 NC\(^{-1}\). The work function of the metal surface is

\[
\text{Options:}
\begin{align*}
1 & 2 \text{ eV} \\
2 & 2.2 \text{ eV}
\end{align*}
\]
4 eV

6.2 eV

Question Number : 117  Question Id : 1874634597  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A hydrogen atom emits a photon of wavelength \( \frac{36}{35R} \) when it is jumped from its \( n \)th excited state to ground state. Then the quantum number \( n \) is (R is Rydberg constant)

\[ \text{Options} : \]
1. 8
2. 7
3. 5
4. 6

Question Number : 118  Question Id : 1874634598  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Assertion (A) : Fragments produced in the fission of \(^{235}\text{U}\) are radioactive
Reason (R) : The fragments in the fission of \(^{235}\text{U}\) have a proton to neutron ratio of 2.5

\[ \text{Options} : \]
Both (A) and (R) are correct and (R) is the correct explanation of (A)

(A) రిలీఫ్ నుండి నిలాచి నిలాచి నిలాచి నిలాచి (R) అనేది (A) చెప్పిన విస్తృతి

1.

Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(A) రిలీఫ్ నుండి నిలాచి నిలాచి నిలాచి నిలాచి (R) అనేది (A) చెప్పిన విస్తృతి

2.

(A) is correct but (R) is not correct

(A) రిలీఫ్ నుండి నిలాచి నిలాచి నిలాచి (R) అనేది

3.

(A) is not correct but (R) is correct

(A) రిలీఫ్ నుండి నిలాచి (R) అనేది

4.

In the circuit given, the current through Zener diode is

ప్రదక్షిణంలో నిలాచి, అమలు చేసే కొండ విశేషణ ప్రాంపత్రిక

![Circuit Diagram]

Options:

1. 10 mA

2. 6.67 mA

3. 3.33 mA

4. 5 mA
Coaxial cable, a widely used wire medium for transmission of signals offers a bandwidth of approximately

Options:
1. 600 kHz
2. 750 MHz
3. 850 GHz
4. 500 Hz

---

The spectral line observed at 434 nm in the Balmer series of the hydrogen spectrum corresponds to a transition of an electron from the $n^{th}$ orbit. What is the value of $n$? (Rydberg constant $R_H = 109,677$ cm$^{-1}$)

Options:
1. 3
2. 4
3. 5
The energy of 2s orbitals of H, He and Li follow the order:

H, He, Li 2s అడుగులు చూడింది ఇది రెండవ రెంటిసిద్ధం. 

Options:
1. He < H < Li
2. Li < He < H
3. Li > He > H
4. He > H > Li

X and Y are two elements which form oxides of the type XO₃ and Y₂O₅ with highest oxygen content. Identify the group numbers to which X and Y belongs.

X, Y ఎందుకు రెండు మార్కులకు అందరూ ఆధారంగా లభించడం లేదు లభించడు లేదా XO₃, Y₂O₅ అత్యధిక సంఖ్యల నియంత్రణ. X, Y యే రెండు ఎందరు ఎందరు.

Options:
1. 13, 15
2. 16, 15
3. 13, 17
4. 16, 17
Match the following.

List - I
A) $[\text{CrF}_6]^{3-}$
B) XeF$_4$
C) PCl$_5$
D) BrF$_5$

List - II
I) sp$^3$d$^2$, square planar
II) sp$^3$d, square planar
III) sp$^3$d$^2$, square pyramidal
IV) sp$^3$d, trigonal bipyramidal
V) sp$^3$d$^2$, octahedral

The correct answer is

Options:

1. A B C D
   III I IV V
2. A B C D
   III I II V
3. A B C D
   V I IV III
4. A B C D
   V II IV III
Identify the pair of species having same hybridisation for central atom but possess different geometry

ఇంతట్టు కలిగిన సముపామం ఉంది అంది విభాగాలు వరుసగా ఉంటాయి కాబట్టి వితరణలు రెండు సమానం

to be.

Options:
1. $\text{CH}_4, \text{NH}_4$
2. $\text{C}_2\text{H}_2, \text{BeCl}_2$
3. $\text{PF}_5, \text{IF}_5$
4. $\text{PCl}_5, \text{ClF}_3$

At (K), a hypothetical gas consisting of 100 molecules has the following distribution of velocities. ($N =$ Number of molecules; $V =$ velocity in cm s$^{-1}$).

$N$  $V$
---  ---
2    $4 \times 10^3$
2    $4 \times 10^8$
10   $3 \times 10^4$
20   $5.5 \times 10^5$
25   $4 \times 10^5$
35   $6.8 \times 10^6$
6    $2 \times 10^7$

The most probable velocity (in cm s$^{-1}$) for this gas is

$N$ లోని ప్రతి పదానం అడుగు ప్రతిపాదం పదానం (cm s$^{-1}$ ఉంటుంది)

Options:
4.90 g of impure potassium chlorate on heating shows a weight loss of 0.384 g. What percent of the impure potassium chlorate has decomposed?

Options:
1. 20
2. 30
3. 40
4. 80

The standard molar enthalpy of vaporisation of benzene $\Delta_{\text{vap}} H^\circ$ at 353 K is 30.8 kJ mol$^{-1}$. If the benzene vapours behave as an ideal gas, the change in internal energy of vaporisation of 78 g of benzene at 353 K in kJ mol$^{-1}$ is (1 L-atm = 101.32 J)

Options:
1. 37.87
2. 27.87
3. 33.74
4. 17.87

The equilibrium partial pressures of CO\(_{(g)}\), CO\(_2(g)\) in the equilibrium reaction CO\(_2(g)\) + C\(_{(s)}\) \rightleftharpoons 2CO\(_{(g)}\) at 1000 K are 0.66 and 0.15 bar respectively. The equilibrium constant \(K_c\) approximately is

\[
1000 K \quad \text{CO}_2(g) + C(s) \rightleftharpoons 2\text{CO}(g) \quad \text{has initial} \quad \text{CO}_2(g), \text{CO}_2(g) \quad \text{final} \quad \text{0.66, 0.15 bar} \quad \text{has} \quad \text{K}_c \quad \text{approx}
\]

Options:
1. 0.35
2. 2.90
3. 0.035
4. 0.29

20 mL of 0.2 M sodium hydroxide solution is added to 40 mL of 0.2 M acetic acid solution. What is the pH of the solution? (pKa of CH\(_3\)COOH = 4.8)

\[
20 \text{ mL} \quad 0.2 \text{ M sodium hydroxide (NaOH)} \quad 40 \text{ mL} \quad 0.2 \text{ M acetic acid (CH}_3\text{COOH)} \quad \text{What is the pH?} \quad \text{pKa of CH}_3\text{COOH} = 4.8
\]

Options:
1. 9.2
Question Number : 131  Question Id : 1874634611  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In acidic medium, aqueous potassium permanganate with hydrogen peroxide gives

Options :
1. $\text{Mn}^{3+}, \text{H}_2$
2. $\text{Mn}^{2+}, \text{O}_2$
3. $\text{Mn}^{2+}, \text{H}_2$
4. $\text{MnO}_2, \text{O}_3$

Question Number : 132  Question Id : 1874634612  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following metal ions form the stable super oxide?

Options :
1. $\text{Li}^+$
2. $\text{Mg}^{2+}$
3. $\text{Na}^+$
4. $\text{K}^+$
The product/s formed when borax dissolves in water is/are:

オールが溶けたときの生成物は？

Options:
1. Na OH, H₃BO₃
2. Na₂[B₄O₅(OH)₄]
3. NaH, B₂O₃
4. B₂H₆, NaOH

Identify the correct statement.

正しい選択肢を特定してください。

Options:
1. Non-directional covalent bonds are present throughout the crystal lattice of diamond.
   ダイヤモンドの結晶格子に非方向性の共役結合が存在する。
2. Fullerenes are the pure forms of carbon
   フルーレンは純粋な炭素の形態である。
3. C–C bond length in the layer of graphite is 154 pm
   炭化水素中のC–C結合の長さは154 pmである。
4. Carbon monoxide is a water soluble gas
   酸素は水に溶けるガスです。

Question Number : 135  Question Id : 1874634615  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The concentration of fluoride ions in drinking water upto 1 ppm make the enamel on teeth much harder by converting $X$ into fluorapatite. What is $X$?

అయితే 1 ప్పిం సాధనం చేస్తే కొన్నా వారు $X$ పోయు ఫ్లూరాపాటితే ముఖ్యతన పాటితే.

Options:
1. $[3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2]$
2. $[3\text{Ca}_3(\text{PO}_4)_2 \cdot \text{Ca(OH)}_2]$
3. $[3\text{Ca(OH)}_2 \cdot 3\text{Ca}_3(\text{PO}_4)_2]$
4. $[\text{Ca}_3(\text{PO}_4)_2 \cdot 3\text{CaF}_2]$

Nitrogen, sulphur and phosphorus present in organic compounds are detected by the formation of which of the following coloured substances respectively.

అమిత్త ఫ్లూరాపాటితే ముఖ్యతన పాటితే.

Options:
1. $\text{Fe}_4[\text{Fe(CN)}_6]_3$, Prussian blue, Violet, Yellow
2. $\text{Fe}_4[\text{Fe(CN)}_6]_3$, $[\text{Fe(SCN)}]^{2+}$, $\text{(NH}_4\text{)}_3\text{PO}_4 \cdot 12\text{MoO}_3$, Blood red, Violet
The number of electrophiles and nucleophiles present in the species given below are respectively.

\[ \text{BF}_3, \text{CO}_2, \text{Me}_3\text{N}, \text{SO}_3, \text{CH}_3\text{CO}, \text{HS}^-, \text{NO}_2^+, \text{FeCl}_3, \text{H}_2\text{O} \]

Options:
1. 6, 3
2. 3, 6
3. 4, 5
4. 5, 4
What is D in the following reaction sequence?

What is D in the following reaction sequence?

\[
\begin{align*}
C_2H_4 & \xrightarrow{\text{dil. KMnO}_4} B \\
C_3H_4 & \xrightarrow{\text{Hg}^{2+}/\text{H}^+ \text{H}_2\text{O}, 333K} C \\
\end{align*}
\]

\[
\begin{align*}
\text{dry HCl} & \rightarrow \text{D} \\
\end{align*}
\]

Options:

1. ![Structure 1]
2. ![Structure 2]
3. ![Structure 3]
4. ![Structure 4]

In which of the following reactions alkane is not formed?

In which of the following reactions alkane is not formed?

\[
\begin{align*}
\text{CH}_3\text{Br} & \xrightarrow{\text{Na/ dry ether}} \\
\end{align*}
\]

Options:

1. ![Structure 5]
An element forms a body centered cubic (bcc) lattice with edge length of 300 pm. If the density of the element is 7.2 g cm\(^{-3}\), the number of atoms present in 324 g of it approximately is

\[ \text{Options:} \]

1. \(3.33 \times 10^{23}\)
2. \(6.66 \times 10^{23}\)
3. \(3.33 \times 10^{24}\)
4. \(6.66 \times 10^{24}\)
An ideal solution of hexane and heptane at 30 °C has a vapour pressure of 95 bar with hexane mole fraction 0.305. In vapour phase hexane mole fraction is 0.555. The vapour pressures of pure hexane and heptane at 30 °C respectively in bar are

\[30 \degree C \text{ क्ष} \ 0.305 \text{ राष्ट्रीय \ अराधना \ संख्या, \ राष्ट्रीय \ राष्ट्रीय \ अराधना \ संख्या} \ 95 \text{ bar}.
\text{राष्ट्रीय \ अराधना \ संख्या} \ 0.555. \ 30 \degree C \text{ क्ष} \ 0.305 \text{ राष्ट्रीय \ अराधना, \ राष्ट्रीय \ राष्ट्रीय \ अराधना}
\text{संख्या}
\
Options:
1. 172.9, 60.9
2. 60.8, 172.9
3. 30.4, 86.5
4. 86.5, 30.4

The vapour pressure of a solution (b) as a function of temperature (a) is plotted as a graph for two solutions of same molar concentration along with water as shown below. A, B and C are respectively.

Options:
H₂NCONH₂, H₂O, NaCl

1.

H₂O, H₂NCONH₂, NaCl

2.

NaCl, H₂O, H₂NCONH₂

3.

NaCl, H₂NCONH₂, H₂O

4.

Question Number : 143  Question Id : 1874634623  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If E⁺₀ is 1.05 V, the emf of the cell for the following cell reaction

Ni(s) + 2Ag⁺(0.004M) → Ni²⁺(0.16M) + 2Ag(s) at 298 K in V is

\[ E⁺₀ = 1.05 \text{ V} \]

\[ \text{Ni}^{2+} + 2\text{Ag}⁺(0.004M) → \text{Ni}^{2+}(0.16M) + 2\text{Ag}(s) \text{ 298 K} \]

Options:

1. 0.932

2. 1.227

3. 0.732

4. 1.397

Question Number : 144  Question Id : 1874634624  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which one of the following is **not** the correct statement with respect to order of a reaction?

**హిస్తుల కోర్టుకు ఉపస్థిత ఇది నాటిడి నియత్తి వాని నియత్తి ప్రతౌతారణగానినా?**

Options:
order can be determined experimentally.

1.

order of reaction is equal to sum of the powers of concentration terms in differential form of rate law.

2.

order does not change with change of pressure or temperature.

3.

order cannot be fractional.

4.

---

300 mL of gold sol is mixed with 30 mL of 10% NaCl solution. The mass of Haemoglobin in mg required to protect the gold sol from coagulation is (gold number of Haemoglobin is 0.03)

300 mL గాలు చేసినా 30 mL గా 10% NaCl సల్యూషన్ చేసినా. ఇందులో మరియు గాలు చేసినా 0.03 గుండా మాత్రమే హామోగ్లాబిన్ మిగిలించాలంటే, మహాసరికి మాత్రమే mg ఏం (హామిసంస్తు గుండా మిగిలించా)

Options:

1. 0.3
2. 0.09
3. 0.03
4. 0.9
In froth-floatation process what is the depressant used in the separation of sulphide ores of Zinc and Lead?

పురాతన వ్యాప్తిలో మల్లి తోపి నడిమి అలంకరణలో విద్యార్థుల భారించడానికి ఉపయోగించబడును?

Options:
1. NaCl
2. Na₂CO₃
3. NaCN
4. Na₂SO₄

In which of the following oxyacids of phosphorous, one P = O, two P – H and one P – OH bonds are present.

ఎందో వైట్టిన్ వాయిదులలో ఒక P = O, రెండు P – H మరియు ఒక P – OH బంధాన్ని ఉపయోగించబడును?

Options:
1. Phosphonic acid
2. Phosphinic acid
3. Orthophosphoric acid
Pyrophosphoric acid

Identify the reaction in which SO₂ is not formed?

SO₂ నిల్పించిన రాసిన రాసిత్వాని.

Options:
1. Na₂SO₃ (aq) + dil H₂SO₄ →
2. Na₂SO₃ (ఎస్సు) + శరా H₂SO₄ →
3. S + O₂ (ఒయిర్) →
4. S + conc. H₂SO₄ →
5. S + సిరక్స్ H₂SO₄ →
6. 2NaCl + H₂SO₄ →

In which of the following reactions oxygen gas is not formed?

ఒయిన్ గాసు నిల్పించడం లేదు?

Options:
1. XeF₄ + O₂F₂ →
2. XeF₄ + H₂O →
3. XeF₆ + H₂O →
The magnetic moment of which of the following complexes is maximum?

Options:

1. $\left[\text{Co(NH}_3\text{)}_6\right]^{3+}$
2. $\left[\text{Ni(CN)}_4\right]^{2-}$
3. $\left[\text{CoF}_6\right]^{3-}$
4. $\left[\text{NiCl}_4\right]^{2-}$

A metal ion ($M^{n+}$) forms octahedral $[ML_6]^{n+}$ and tetrahedral $[ML_4]^{n+}$ complexes with same ligand at different experimental conditions. The $\Delta_0$ of $[ML_6]^{n+}$ is 3 eV. What is the energy in eV of $e_g$ orbital of $[ML_4]^{n+}$ complex?

Options:

1. $\frac{4}{5}$
2. $\frac{4}{5}$
The catalyst triethyl aluminium and titanium tetrachloride finds use in the formation of the polymer.

Options:
1. Teflon
2. Low density polythene
3. Polyacrylonitrile
4. High density polythene
Match the following:

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Ascorbic acid</td>
<td>I) Rickets</td>
</tr>
<tr>
<td>B) Vitamin D</td>
<td>II) Muscular weakness</td>
</tr>
<tr>
<td>C) Vitamin B₁</td>
<td>III) Convulsions</td>
</tr>
<tr>
<td>D) Vitamin E</td>
<td>IV) Anula</td>
</tr>
<tr>
<td></td>
<td>V) Beri beri</td>
</tr>
</tbody>
</table>

The correct answer is

Options:

1. A B C D
   I IV II III

2. A B C D
   IV I III II

3. A B C D
   I IV III II

4. A B C D
   IV I V II
Identify the correct pairs from the following.

I) Sodium benzoate  
II) Sodium stearate  
III) Sodium lauryl sulphate  
IV) Alitame

Antioxidant  
Soap  
Antiseptic  
Artificial sweetener

Options:
1. II, IV
2. II, I
3. III, IV
4. II, III

The number of monochloroderivatives possible, when 2, 2-Dimethylpropane reacts with Chlorine in the presence of UV-light is

UV-లోని 2, 2-డీమిథిల్ ప్రొపన్ సత్తూరి చలిపారు లేదా చలిపారు వరుసలేదు సారాసరి కారణం

Options:
1. 4
2. 3
3. 2
In the following sequence of reactions identify the functional groups present in the resulting compound Y.

\[ \text{C}_6\text{H}_5\text{N}_2\text{Cl} + \text{H}_2\text{O} \rightarrow \text{X} \xrightarrow{i)} \text{CHCl}_3/\text{aq.} \text{NaOH} \rightarrow \text{Y} \xrightarrow{ii)} \text{H}_3\text{O}^+ \]

Options:
1. \(-\text{Cl}, \quad \text{C} = \text{CH}_3\)
2. \(-\text{OH}, \quad \text{C} = \text{O}\)
3. \(-\text{OH}, \quad \text{C} = \text{O}\)
4. \(-\text{Cl}, \quad \text{O} = \text{C} = \text{CH}_3\)

The correct set of reagents (X, Y, Z) required to convert benzene to m-nitrobenzoic acid are

Options:
1. CO, HCl, anhydrous AlCl₃; \quad \text{KMnO}_4; \quad \text{LiAlH}_4
2. CO, HCl, anhydrous AlCl₃;
2. X  Y  Z
   \( \text{HNO}_3 + \text{H}_2\text{SO}_4; \quad \text{Br}_2, \text{AlCl}_3; \quad \text{KCN} / \text{H}_3\text{O}^+ \)

3. X  Y  Z
   \( \text{Br}_2, \text{AlCl}_3; \quad \text{HNO}_3 + \text{H}_2\text{SO}_4; \quad \text{KCN} / \text{H}_3\text{O}^+ \)

4. X  Y  Z
   \( \text{CO}, \text{HCl}, \text{anhydrous} \text{AlCl}_3; \quad \text{KMnO}_4; \quad \text{conc. HNO}_3 + \text{conc. H}_2\text{SO}_4 \)
   \( \text{CO}, \text{HCl}, \text{anhydrous} \text{AlCl}_3; \quad \text{H}_2\text{NO}_3 + \text{nH}_2\text{SO}_4 \)

**Question:** The reduction products of an aldehyde, ketone and carboxylic acid in the presence of lithium aluminium hydride are respectively X, Y and Z. What are X, Y and Z?

**Options:**
1. \( \text{R CH(OH)} \text{R}, \text{R CH}_2\text{OH}, \text{R CH}_2\text{OH} \)
2. \( \text{R CH}_2\text{OH}, \text{R CH(OH)} \text{R}, \text{R CH}_2\text{OH} \)
3. \( \text{R CH}_2\text{OH}, \text{R CH}_2\text{OH}, \text{R}_2\text{CH OH} \)
4. \( \text{R}_2\text{CH OH}, \text{R CH}_3, \text{R CH}_2\text{OH} \)
A carbonyl compound ‘A’ (C₈H₈O) does not give iodoform test and on oxidation gave ‘B’. On heating B with ammonia at higher temperature forms ‘C’. What are ‘A’ and ‘C’?

చివరలేదంటే ‘A’ (C₈H₈O) ఎమ్మెల్దించటం మొగ్గ తోంగచ్చం మాత్రం ఐడోఫర్మ్ గుర్తించాలంటే ‘B’ గా అయితే. అంటే చెప్పాలంటే ‘B’ చే ఐడోఫర్మ్ గుర్తించాలంటే ‘C’ అయితే ‘A’ ఇదేందరూ ‘C’ ఎంచుకోవాలి?

Options:

1. ‘A’
   
   ![Image 1](https://via.placeholder.com/150)

   ‘C’
   
   ![Image 2](https://via.placeholder.com/150)

2. ‘A’
   
   ![Image 3](https://via.placeholder.com/150)

   ‘C’
   
   ![Image 4](https://via.placeholder.com/150)

3. ‘A’
   
   ![Image 5](https://via.placeholder.com/150)

   ‘C’
   
   ![Image 6](https://via.placeholder.com/150)

4. ‘A’
   
   ![Image 7](https://via.placeholder.com/150)

   ‘C’
   
   ![Image 8](https://via.placeholder.com/150)
What is Y in the following reaction sequence

\[ \text{C}_6\text{H}_5\text{N}_2\text{Cl} \xrightarrow{\text{H}_3\text{PO}_2/\text{H}_2\text{O}} X \xrightarrow{\text{CO}_2\text{HCl}} Y \]

Options:

1. CHO

2. OH CHO

3. COOH

4. OH COOH