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 $f(50) = \phantom{0}$

Options:

1. 75
2. 2
3. 12
4. 3
5. 6
6. 75

Question Number : 2  Question Id : 1874634482  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
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

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

Options:

1. \( n = 1 \) only
2. \( n = 10 \) only
3. All positive integer values of $n$

4. Let $A = \begin{bmatrix} 7 & 5 \\ 4 & 8 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} -5 & 3 \\ 7 & -4 \end{bmatrix}$.

If $\text{Tr}(S)$ denotes the trace of a square matrix $S$ then

$$\sum_{k=0}^{\infty} \frac{1}{3^k} \text{Tr}\{A(B\cdot C)^k\} =$$

$$A = \begin{bmatrix} 7 & 5 \\ 4 & 8 \end{bmatrix}, \quad B = \begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}, \quad C = \begin{bmatrix} -5 & 3 \\ 7 & -4 \end{bmatrix}$$

$\text{Tr}(S)$ is defined as the sum of the diagonal elements. Each element of $S$ is multiplied by $3$ and then summed.

$$\text{Tr}(S) \quad \text{is defined as} \quad \sum_{k=0}^{\infty} \frac{1}{3^k} \text{Tr}\{A(B\cdot C)^k\} =$$

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 \( 4\alpha + 2\beta + 3\gamma = \)

\[
x + y + z = 4, \ 2x - y + 3z = 9, \ 3x + y + 2z = 8 \text{ are the solutions. Hence, the answer is } x = \alpha, \\
y = \beta, z = \gamma \text{ are the solutions. Hence, } 4\alpha + 2\beta + 3\gamma =
\]

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 \(|z - \frac{6}{z}| = 5\), then the maximum value of \(|z|\) is

\(z\) యొడి అనే మిశ్రమ సంఖ్య, \(|z - \frac{6}{z}| = 5\) అయితే, \(|z|\) యొడి మిశ్రమ సంఖ్య

Options :

1. 3
2. 2
3. 1
3
2

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

\[
a = 3 + 4i, \quad Z_1 = \text{some complex number}, \quad |Z_1| = 3, \quad |Z_2 - a| = 2
\]

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

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

\[
x^3 + 3x^2 + 3x + 28 = 0 \quad \text{Given}
\]

\( \alpha \) is real, \( \beta, \gamma \) are complex, \( 2\alpha + 3\beta + 3\gamma = \)

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

\[
\text{Question Number : 11  Question Id : 1874634491  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical}
\]
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 $(p, q) =$

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 $A \cap B \cap C =$

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

\[ \frac{7}{3}, \infty \]

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

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

\[ 6x^4 - 35x^3 + 62x^2 - 35x + 6 = 0 \]

Options:
1. \( 2 \)
2. \( \frac{5}{2} \)
3. \( \frac{7}{2} \)
4. \( 3 \)
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

A man has 5 male and 4 female relatives. His wife has 4 male and 5 female relatives. The number of ways in which they can invite 5 male and 5 female relatives so that 5 of them are man’s relatives and remaining 5 are his wife’s relatives.

Options:
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 $r = \frac{5 \cdot 7}{2!} \cdot \frac{5 \cdot 7 \cdot 9}{3!} \cdot \frac{5 \cdot 7 \cdot 9}{4!} \cdot \ldots \cdot$, then $x^2 + 4x =

\begin{align*}
x &= \frac{5}{2!} + \frac{5 \cdot 7}{3!} + \frac{5 \cdot 7 \cdot 9}{4!} + \ldots \\
x^2 + 4x &= \frac{5}{2!} + \frac{5 \cdot 7}{3!} + \frac{5 \cdot 7 \cdot 9}{4!} + \ldots
\end{align*}
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 \( \sin(ax + b) \) and \( \tan(cx + d) \) are respectively \( \frac{4}{7} \) and \( \frac{2}{5} \), then
\[
\sin(|a| + |c|) + \cos(|a| - |c|) = 
\]
\[
\sin(ax + b) \text{ and } \tan(cx + d) \text{ are respectively } \frac{4}{7} \text{ and } \frac{2}{5}. \text{ Hence,}
\]
\[
\sin(|a| + |c|) + \cos(|a| - |c|) = 
\]
Options:
1. -1
2. 0
3. 1
4. 2

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
\[
\tan(x + 100^\circ) = \tan(x + 50^\circ) \cdot \tan x \cdot \tan(x - 50^\circ) \text{ is an argument where } x + 50^\circ \text{ is } \frac{\pi}{4} \text{ radians.}
\]
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

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

\( \alpha \neq 0 \) \( \Rightarrow \) \( \cos(\theta + \alpha) \), \( \cos \theta \) ముందు ప్రవేశించి మినంగం \( \cos(\theta - \alpha) \) యొక్క తోడవ మరింత కొద్ది కావడం ఉండాలి. \( \therefore \)

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

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

\( \cos 2\theta + \alpha \sin \theta = 2\alpha - 7 \) యొక్క పరమాణు సాధనం ఉండడం అంటే, అయితే

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 \( \sin^{-1} \frac{x}{3} + \sin^{-1} \frac{2x}{3} = \sin^{-1} x \), then the roots of the equation \( x^2 - ax - 1 = 0 \) are

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

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

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

is defined is

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

Options:

1. \( \phi \)
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 \(\frac{1}{a+b} + \frac{1}{a+c} = \)

\[\text{In a } \triangle ABC \text{ if the angle } A = 60^\circ \text{ then } \frac{1}{a+b} + \frac{1}{a+c} = \]

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

\[\text{In a } \triangle ABC \text{ then } 8R^3 \sum \sin^3 A \cos(B-C) = \]

Options :

1. \(abc\)

2. \(4abc\)
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

\[ \frac{\text{radius of the circum circle}}{\text{radius of the incircle}} = \frac{a}{b/2} = \frac{4}{5/2} = \frac{8}{5} \]

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

\[ \frac{\vec{a} + 4\vec{b} - 3\vec{c}}{\vec{a} + 7\vec{b} - 6\vec{c}} \]

Options :
1. 1 : 2
2. \(-1 : 3\)
Let \( \pi \) be the plane passing through the points \( \vec{r}, \vec{j}, \vec{i} + \vec{j} + \vec{k} \) and \( L \) be the line passing through the point \( \vec{i} + 2\vec{j} + 3\vec{k} \) and parallel to the vector \( \vec{i} - \vec{j} + \vec{k} \). If \( P(\alpha, \beta, \gamma) \) is the point of intersection of the plane \( \pi \) and line \( L \), then, \( \sqrt{(\alpha^2 + \beta^2)} = \sqrt{14} \).

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

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

Options:
Let \( \vec{a}, \vec{b}, \vec{c} \) be three non-coplanar vectors and

\[
\vec{a}' = \frac{\vec{b} \times \vec{c}}{|\vec{a} \vec{b} \vec{c}|}, \quad \vec{b}' = \frac{\vec{c} \times \vec{a}}{|\vec{a} \vec{b} \vec{c}|}, \quad \vec{c}' = \frac{\vec{a} \times \vec{b}}{|\vec{a} \vec{b} \vec{c}|}.
\]

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

\[
|\vec{a}'| = \frac{|\vec{b} \times \vec{c}|}{|\vec{a} \vec{b} \vec{c}|}, \quad |\vec{b}'| = \frac{|\vec{c} \times \vec{a}|}{|\vec{a} \vec{b} \vec{c}|}, \quad |\vec{c}'| = \frac{|\vec{a} \times \vec{b}|}{|\vec{a} \vec{b} \vec{c}|}.
\]

Options:

1. \( |\vec{a}'| \)
2. \( \frac{1}{|\vec{b}'|} \)
3. \( |\vec{c}'| \)
Let \( \overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c} \) 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 \( \overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c} \). 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 \( x^2 + y^2 = \)

\[
\frac{1}{|\overrightarrow{a} \times \overrightarrow{c}|}
\]

**Options:**

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

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

\[
\frac{1}{|\overrightarrow{a} \times \overrightarrow{b}|} \times \overrightarrow{c}, \overrightarrow{b}, \overrightarrow{d}
\]

**Options:**
Question Number : 35  Question Id : 1874634515  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical

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

$\frac{3 + 5 + 11 + 13 + 17 + 19 + 23 + 29}{8} = \frac{98}{8} = 12.25$

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

Question Number : 36  Question Id : 1874634516  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical

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

$\frac{\left(45 - \frac{450}{10}\right)^2 + \left(49 - \frac{450}{10}\right)^2 + \left(55 - \frac{450}{10}\right)^2 + \cdots + \left(55 - \frac{450}{10}\right)^2}{10} = \frac{20.25 + 4.00 + 25.00 + \cdots + 25.00}{10} = 51$

Options :
1. 51
2. 42.8
3. 39.4
4. 35.6

Question Number : 37  Question Id : 1874634517  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
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

 sede pakkala varthe mudikayenca, madhuram tharumpo nere nambu iddo loodhupule margu
7 nne prana nubangal

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

Question Number : 38  Question Id : 1874634518  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If A and B are two events of a random experiment such that \( P(\overline{A}) = 0.3 \), \( P(B) = 0.4 \) and \( P(A \cap B) = 0.5 \), then \( P(A \cup B) + P(B|A \cup B) = \)

A and B అనగా రెండు ఉద్యోగ సమస్యలు పరిమితిగా సంబంధించినది, \( P(\overline{A}) = 0.3 \), \( P(B) = 0.4 \), \( P(A \cap B) = 0.5 \) నామే, \( P(A \cup B) + P(B|A \cup B) = \)

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

Options:
1. \(\frac{2}{3}\)
2. \(\frac{4}{9}\)
3. \(\frac{1}{3}\)
4. \(\frac{2}{9}\)

Question Number : 40  Question Id : 1874634520  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
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.

\[
S = \{1, 2, 3, \ldots, 50\} \text{ and } A_k = k \text{ in } S \text{ for } k \in \mathbb{N}.
\]

\[
x_k \text{ is a number chosen from } A_k \text{ and } x_k \text{ is chosen at random.}
\]

List - I

<table>
<thead>
<tr>
<th>( A )</th>
<th>( B )</th>
<th>( C )</th>
<th>( D )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x_3 &lt; 30 )</td>
<td>( P(15 &lt; x_4 \leq 36) )</td>
<td>( x_7 &gt; 35 )</td>
<td>( P(x_{11} &gt; 11) )</td>
</tr>
</tbody>
</table>

List - II

<table>
<thead>
<tr>
<th>( \text{I)} )</th>
<th>( \text{II)} )</th>
<th>( \text{III)} )</th>
<th>( \text{IV)} )</th>
<th>( \text{V)} )</th>
<th>( \text{VI)} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{2} )</td>
<td>( \frac{2}{3} )</td>
<td>( \frac{2}{7} )</td>
<td>( \frac{1}{4} )</td>
<td>( \frac{3}{4} )</td>
<td>( \frac{9}{16} )</td>
</tr>
</tbody>
</table>

The correct match is

**Options:**

1. \( A \ B \ C \ D \)
   
2. \( A \ B \ C \ D \)
   
3. \( A \ B \ C \ D \)
4. 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)

5. 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

$P$ యొక్క వ్యాసం గదులు $BC$ సరైన మార్కు, $P$ యొక్క వ్యాసం $AB$ మరియు $AC$ కంటే దూర గుర్తు గుర్తు గుర్తు గుర్తు గుర్తు గుర్తు గుర్తు. $A\left(0, \frac{4}{3}\right)$, $B(-1, 0)$, $C(1, 0)$ వ్యాసం కంటే వ్యాసం ప్రతి వ్యాసం యొక్క వ్యాసం ప్రతి వ్యాసం యొక్క వ్యాసం యొక్క వ్యాసం యొక్క వ్యాసం యొక్క 

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 కు నంది (4, 1) అంటే, నంది Q తో వద్ద గల యొక్క ప్రతి కో-వర్గాలు. రేల పరిమితం నంది Q తో వద్ద గల రింది R కు నంది R నంది డిఫన్ పరిమితం

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

చిత్రం \( x + y + 1 = 0 \) నంది నండి నండి

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. \(x \cos(225°) + y \sin(225°) = \frac{1}{\sqrt{2}}\)

4. \(x \cos(45°) + y \sin(45°) = -\frac{1}{\sqrt{2}}\)

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

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

Options:
\[
\begin{align*}
\beta x + \alpha y &= 3xy \\
\alpha x + \beta y &= 3xy \\
\alpha x - \beta y &= 3xy \\
\beta x - \alpha y &= 3xy
\end{align*}
\]

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

\[
2x^2 - y^2 = 0, \quad x + y - 1 = 0 \quad \text{वृत्त की वृत्त दीर्घतिक्षा पूर्वी, अद्वितीय प्रकार} \quad \text{A में A में}
\]

\[
2x^2 - 5xy + 2y^2 = 0, \quad 7x - 2y - 12 = 0 \quad \text{वृत्त की वृत्त दीर्घतिक्षा पूर्वी, अद्वितीय प्रकार} \quad \text{B में B में}
\]

Options :

1. \(\sqrt{5}\)
2. 1
3. 5
4. \(\sqrt{2}\)

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

\[
x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0 \quad \text{वृत्त की वृत्त दीर्घतिक्षा पूर्वी, अद्वितीय प्रकार}
\]

Options :
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

\[
\text{Since } x^2 + y^2 = 75 \text{ is a circle, } \alpha \text{ cannot be a root of the equation.}
\]

Options:

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

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

\[
x - 6y - 12 = 0 \text{ cuts the circle } S \equiv x^2 + y^2 - 4x + 8y + 6 = 0 \text{ at } A, B \text{ and } S = 0 \text{ at } S = 0.
\]

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 \(P(5 \cos \alpha, 5 \sin \alpha), Q(5 \cos \beta, 5 \sin \beta)\) are two points on this circle such that \(\alpha - \beta = \frac{\pi}{2}\), 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{విస్తీర్ణ అంధకార సహాయంగా వ్యాప్తి చెందిన రెండు వేస్తున్న రెండు వృత్తాలు \((a, 0), (-a, 0)\) కనుమే చిన్నాడు. వేస్తున్న \(y = mx + c\) చెప్పటం, తద్వారా \(c^2 =\)

Options :
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 \(\frac{k}{f^2} = \) 

\(g \neq 0, f \neq 0\) వాటి మాత్రమే చాల నమోదు చేసాం, \((x^2 + y^2 + 2gx) + \lambda(x^2 + y^2 + 2fy + k) = 0\) లెద్దం ప్రతీ కొండపు పరిధి పై మధ్య ఎత్తు బట్టి, తిరిగి తాను దిద్దించండి తీసి. తిరిగి తాను దిద్దించండి తీసి. తిరిగి తాను దిద్దించండి తీసి. తిరిగి తాను దిద్దించండి తీసి, అందువలన \(\frac{k}{f^2} = \)

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

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

\[ e = \sqrt{1 - \left(\frac{b}{a}\right)^2} \]

Options:
1. \( \frac{\sqrt{3}}{2} \)
2. \( \frac{1}{2} \)
3. \( \frac{2}{3} \)
4. \( \frac{\sqrt{5}}{3} \)

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

\[ \frac{x^2}{25} + \frac{y^2}{9} = 1 \Rightarrow y = x + c \text{ as } y = x + c \text{ also satisfies the equation, hence } c^2 = \]

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

\((1, -2, -2), (0, 2, 1)\) అంటే దిశా కొంతా మొదటం చూండి రెండవ మొదటం కొంతం చూండి (1, -2, -2), (0, 2, 1) నకండి దిశా కొంతా

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

\((0, 0, 0)\) నుండి రెండు నిలించది నిర్మాణ కుంభాకా కుంభాకా ప్రభావాలు ఇది నిర్మాణ ప్రభావాలు \(45^\circ\) కాదం తద్వి కుడి నిర్మాణ 

Options:

1. 0
2. 2
3. 4
4. 8
1. \( x + 10y + 7z + 4 = 0 \)
2. \( x + 2y + 2z + 4 = 0 \)
3. \( 3x + 2y + 2z = 0 \)
4. \( x + 10y + 7z - 4 = 0 \)

Question Number : 62  Question Id : 1874634542  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical
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
Options :
1. 4
If \( f(x) = \int_{-1}^{x} t \, dt \), \( x \geq -1 \), then

\[ x \geq -1 \implies f(x) = \int_{-1}^{x} t \, dt \quad \text{is continuous, differentiable} \]

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 \( x = 0 \)
4. \( f \) and \( f' \) are differentiable at \( x = -1 \)
If \( x = \sinh^{-1}\left[ \log\left(1 + \sqrt{y}\right) \right] \), then \( \frac{dy}{dx} = \)

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

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

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

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

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

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

\( f(x) = \frac{1}{9} \begin{vmatrix} \cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix} \) आयतन, अतः \( \frac{d^2 f}{dx^2} = \)

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

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

\( y^2 = 8(x + 4) \) तथा \( y^2 = 24(4 - x) \) विधि, कोण अंतर

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

\[
x > 0 \ \Rightarrow \ f(x) = x^{1/x} \text{ తెలుగులో}
\]

Options:
1. increasing in \((1, \infty)\)
   \((1, \infty) \), ఆకర్షించబడింది తేందువలు

2. decreasing in \((1, \infty)\)
   \((1, \infty) \), అసాధారణం తేందువలు

3. increasing in \((1, e)\) and decreasing in \((e, \infty)\)
   \((1, e) \), ఎక్కువ తేందువలు \((e, \infty) \), అసాధారణం తేందువలు

4. decreasing in \((1, e)\) and increasing in \((e, \infty)\)
   \((1, e) \), అసాధారణం తేందువలు \((e, \infty) \), ఎక్కువ తేందువలు
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

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

\[f(x) \in \text{అమ్మనం మాట్లాడుతుంది}.
\]

\[
\text{ఇతరికంగా సరళరంధించ వస్తుంది, \( c \) మేము}
\]

Options:

1. \( \frac{\sqrt{21}}{6} \)
2. \( \frac{1}{6} \)
3. \( 1 - \frac{\sqrt{21}}{6} \)
4. \( 1 + \frac{\sqrt{21}}{6} \)

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

\[
\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 (a > b > 0) \quad \text{ఆపరిమిట్నించండి} \quad \frac{1}{3} \text{ నేను పూర్తి చేసుకోవడానికి,} 
\]

\[
x^2 + y^2 + 2x + 2y + 1 = 0 \text{ చివరిస్తుంది \( ab \) కొరకు మిగిలి ఉంటుంది}
\]

Options:

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

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

\[ \int \frac{2x^{12} + 5x^8}{(1 + x^3 + x^5)^3} \, dx = \]

Options:

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

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

**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 \( 8 I_8 + 7(I_7 - I_6) - 6 I_5 = \)

\[ n = 1, 2, 3, \ldots \Rightarrow I_n = \int \sin^n x \, dx \]

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

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

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

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

Options:

1. \( \frac{1}{5} \)
2. \( \frac{1}{11} \)
3. \( \frac{1}{6} \)
4. \( \frac{1}{2} \)

\[
\text{Let } a > 1 \text{ and } b > 1. \text{ If } f(t) \text{ is a periodic function of period } T \text{ and}
\]

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

\[ a > 1, \ b > 1 \text{ නැලිසිල්ල. } f(t) \text{ දොරි 'T' පැහැරිණිය පිළිතුරු } \text{ කෙසේදින්දෙක්ෂේදීන්}
\]

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

Options:
The area (in sq.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

\[
\int_{0}^{\frac{\pi}{2}} \left( \sin x + \cos x - |\cos x - \sin x| \right) \, dx
\]

Options:
1. \( 4 + 2\sqrt{2} \)
2. \( 4 - 2\sqrt{2} \)
3. \( 2 + 2\sqrt{3} \)
4. \( 6 - 3\sqrt{2} \)
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)

\[
y = \sqrt{c(x + \sqrt{c})}
\]

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

\[
x = 1 \quad \text{and} \quad y = 1 \quad \text{are the points of contact.}
\]

Options:
1. \( 2(y - x) + \log \left| \frac{(x+y)^2}{2} - 2 \right| = 0 \)
2. \( \log \left| \frac{(x+y)^2}{2} - 2 \right| = (x - y)^2 \)
3. \[ \log \left( \frac{(x-y)^2 + 2}{2} \right) + 2(y-x) = 0 \]

4. \[ (x-y) + \log \left( \frac{(x+y)^2 - 2}{2} \right) = 0 \]

**Physics**

Display Number Panel: Yes
Group All Questions: No

Question Number: 81  Question Id: 1874634561  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

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' ఎండుకంటే, 'B' విచేసంఖ్య, 'C' ఐష్టిక ఎండూఫనేసంఖ్య అవసానం 'D' నైమిత్తిక నాయక అవసానం,

A, B, C మంది D యొక్క డీషన్ పదాల పనివేత ద్వారా అయితే

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 వెడుగు స్థానం నుంచి అందరికి 1 m సమర్థ వెడుగు స్థానం నుంచి 1 m పొడుగు విడుదల నందితే, పొడుగు సమర్థ వర్గం నుంచి పొడుగు వర్గం నందితే. పొడుగు 0.5 m పొడుగు వర్గం నుంచి పొడుగు వర్గం నందితే విడుదల విడుదల నందితే. అందరి పొడుగు విడుదల నందితే విడుదల 0.5 m సమర్థ విడుదల విడుదల నందితే (పొడుగు విడుదల = 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 $\frac{1}{2} s$ 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 $= 10$ m s$^{-2}$)

\[ 20\sqrt{2} \text{ m} \]

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

\[ 20\sqrt{2} \text{ m s}^{-1} \]
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

\[
\tan \theta = \frac{2}{3} \tan \theta
\]

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

\[ \frac{1}{2} \rho v^2 A \]

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

\[
\text{(Acceleration due to gravity } = g)\]

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

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

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

Question Number : 90  Question Id : 1874634570  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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 పోల్యుపలుతున్నది 0.36 kg m^2 కనుము రెండు నామకా కాల కలుగు యుద్ధం చేసుకునే 100 rad s^{-1} ప్రథమ మాత్రమే రెండు నామకా రెండు మాత్రమే రెండు మాత్రమే ప్రథమ మాత్రమే ప్రథమ మాత్రమే

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

\[
\begin{align*}
\text{Options:} \\
1. & \quad 9 \text{ ms}^{-1} \\
2. & \quad \sqrt{47} \text{ ms}^{-1} \\
3. & \quad \sqrt{65} \text{ ms}^{-1} \\
4. & \quad 10 \text{ ms}^{-1}
\end{align*}
\]

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

\[
\begin{align*}
\text{Options:} \\
1. & \quad 22.17 \text{ J} \\
2. & \quad 2.217 \text{ J} \\
3. & \quad 221.7 \text{ J}
\end{align*}
\]
4. 0.2217 J

The area of cross-section of steel wire is 0.1 cm² 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

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

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

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

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

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

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)

$$\frac{r_2 - r_1}{r_1} \ \frac{r_1}{r_2}$$

4.

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.

A, B మరియు C ని మాత్రమే ఉంటుంది నిమిమిత్తు నిర్ధిష్టం 1:2:3 మరియు దృష్టి నిర్ధిష్టం 1:1:1. A, B మరియు C ని స్థానం నిర్ధిష్టం 15 °C, 30 °C మరియు 45 °C. అంతిమంటగిన మిశ్రమి నిమిమిత్తు నిర్ధిష్టం కోసం ప్రాధికం నిర్ధిష్టం మిశ్రమి నిర్ధిష్టం కోసం.

<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>B) Mixture of liquids B and C</td>
<td>II) 35 °C</td>
</tr>
<tr>
<td>C) Mixture of liquids C and A</td>
<td>III) 37.5 °C</td>
</tr>
<tr>
<td>D) Mixture of liquids A, B and C</td>
<td>IV) 39 °C</td>
</tr>
</tbody>
</table>

The correct answer is

Options:

1. A B C D
2. A B C D
3. A B C D
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

\[ \text{Options:} \]

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

The y-components of velocities of the molecules of a gas are 

\(-7, -6, -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6, +7 \text{ ms}^{-1}\) then the rms velocity is

\[ \text{Options:} \]

\[ \sqrt{\frac{56}{3}} \text{ ms}^{-1} \]
A metal wire of length 80 cm, area of cross-section 3 mm² and material density 3000 kg m⁻³ is joined to another metal wire of length 60 cm, area of cross-section 1 mm² 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

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

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

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

Options:

1. \(\frac{200}{3}\) Hz
2. \(\frac{400}{3}\) Hz
3. \(\frac{500}{3}\) Hz
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 (Acceleration due to gravity = 10 ms\(^{-2}\) and speed of sound in air = 340 ms\(^{-1}\))

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

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

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)

\[
6 \text{ cm} \quad \text{and} \quad 1 \text{ cm}
\]

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

\[
1.0 \text{ kV} \quad \text{requires} \quad 2 \mu \text{F} \quad \text{capacitors.} \quad 300 \text{ V} \quad \text{can withstand} \quad 1 \mu \text{F} \quad \text{capacitors.} \quad \text{Hence,} \quad \text{the number of capacitors required} \quad \text{is} \quad \frac{1.0}{0.3} = 3.33.
\]

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

\[
\text{‘5 C’ at the centre of the shell of radius} \quad r = 3 \text{ m} \quad \text{gives} \quad \frac{r}{2} \text{ distance from the centre} \quad \text{potential} \quad -9 \times 10^9 \text{ V}.
\]

Options:
1. \(-9 \times 10^9 \text{ V}\)
2. \(30 \times 10^9 \text{ V}\)
3. \(45 \times 10^9 \text{ V}\)
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 పాసా
3. 50 paisa
4. 50 పాసా
5. 20 paisa
6. 20 పాసా
7. 10 paisa
8. 10 పాసా

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

\[ 2 \text{ A (అంతాంగం) సేంతరం 44 \text{ cm పొడవు పునర్వహించబడిన రైతు సమయం.} \]  
\[ \text{అంతాంగం 50 \text{ mT ఎక్స్టిషన్ అల్యుమీనం కలిగి ఉంటుంది.} \]  
\[ \text{అంతాంగం కింద ప్రవేశం నిరోధించబడిన రైతు సమయం.} \]  
\[ \text{అంతాంగం నిరోధించబడిన ప్రతి రైతు సమయం.} \]  

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 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

\[ 2 \text{ A అంతాంగం సేంతరం 44 \text{ cm పొడవు పునర్వహించబడిన రైతు సమయం.} \]  
\[ \text{అంతాంగం 50 \text{ mT ఎక్స్టిషన్ అల్యుమీనం కలిగి ఉంటుంది.} \]  
\[ \text{అంతాంగం కింద ప్రవేశం నిరోధించబడిన రైతు సమయం.} \]  
\[ \text{అంతాంగం నిరోధించబడిన ప్రతి రైతు సమయం.} \]  

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 \text{ cm} \text{ అడుగు మరియు ముందు 21.5 \text{ cm} \text{ అడుగు మరియు} \text{ కుంభాద్యసుఖం కాగా వీటి సమాధురానం రావడా వారి రాయలు వచ్చు విశేషానికి 4200 తీరు మేళ్ళు మాటాంటి విషయం. ఇది నిష్టానం మొదలుతుంది 10 A విషయం నిష్టానం మొదలుతుంది అంటే సమాధురాలు వచ్చింది]  

\[ \mu_0 = 4\pi \times 10^{-7} \text{ Hm}^{-1} \]

**Options:**

1. 20 mT
2. 40 mT
3. 20 \( \pi \) mT
4. 40 \( \pi \) mT

---

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

**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

\[ 200 \text{ turns} \cdot 0.1 \text{ m}^2 \cdot 40 \text{ T} \cdot \sin 30° = 400 \text{ V} \]

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

\[ 0.7 \text{ H} \cdot 220 \text{ V} \cdot 50 \text{ Hz} = 7700 \text{ W} \]

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

\[ \mu_r = \frac{\varepsilon_r}{\varepsilon_0} \]

Options :
1. 2.42
2. 5.76
3. 8.26
4. 4.84

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

\[ 200 \text{ nm} = 2 \times 10^{-7} \text{ m} \]

Options :
1. 2 eV
2. 2.2 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)

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

Options :

1. 
2. 
3. 
4. 
In the circuit given, the current through Zener diode is

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 \( R_H = 109.677 \text{ cm}^{-1} \))

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

H, He, Li యొక్క 2s నెట్టివులు యొక్క ఎంత కలిగిన నియమానం ఉంటాయి.

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 Y₂O₃ with highest oxygen content. Identify the group numbers to which X and Y belongs

X, Y ఎంపిక నందించండి కాను ఒకప్పటి అనుసంధానం దక్షిణ 2O₃, Y₂O₃ ఎంపిక ఆంధ్రప్రదేశం

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

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

List - II
I) $\text{sp}^3d^2$, square planar  
II) $\text{sp}^3d$, square planar  
III) $\text{sp}^3d^2$, square pyramid  
IV) $\text{sp}^3d$, trigonal bipyramidal  
V) $\text{sp}^3d^2$, octahedral

The correct answer is

Options:

1. III I IV V

2. III I II V

3. V I IV III

4. V II IV III
Identify the pair of species having same hybridisation for central atom but possess different geometry

Options:
1. CH₄, NH₄⁺
2. C₂H₂, BeCl₂
3. PF₅, IF₅
4. PCl₅, ClF₃

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

<table>
<thead>
<tr>
<th>N</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4 × 10³</td>
</tr>
<tr>
<td>2</td>
<td>4 × 10⁸</td>
</tr>
<tr>
<td>10</td>
<td>3 × 10⁴</td>
</tr>
<tr>
<td>20</td>
<td>5.5 × 10⁵</td>
</tr>
<tr>
<td>25</td>
<td>4 × 10⁵</td>
</tr>
<tr>
<td>35</td>
<td>6.8 × 10⁶</td>
</tr>
<tr>
<td>6</td>
<td>2 × 10⁷</td>
</tr>
</tbody>
</table>

The most probable velocity (in cm s⁻¹) for this gas is

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

\[
\text{(1 L-atm = 101.32 J)}
\]

353 K నుండి నూన్న సమాధాన బెంజెన్ రింట్ ఉండశెయ్యును, \( \Delta_{\text{vap}} H^\circ \) 30.8 kJ mol\(^{-1}\). ఈసామ్ముల ఉంటే 353 K నుండి నూన్న సమాధాన బెంజెన్ రింట్ ఉండశెయ్యును 78 g బెంజెన్ రింట్ ఉంటే సమాధాన రింట్ ఉండశెయ్యును kJ mol\(^{-1}\) ఉండు ఉంటే (1 L-atm = 101.32 J)
The equilibrium partial pressures of \( \text{CO}_2(g) \), \( \text{CO}_2(g) \) in the equilibrium reaction \( \text{CO}_2(g) + \text{C}(s) \rightleftharpoons 2\text{CO}(g) \) at 1000 K are 0.66 and 0.15 bar respectively. The equilibrium constant \( K_c \) approximately is

\[
1000 \text{ K} \quad \text{CO}_2(g) + \text{C}(s) \rightleftharpoons 2\text{CO}(g) \quad \text{is} \quad \text{approximately} \quad \text{K}_c \quad \text{and} \quad 0.66, 0.15 \text{ bar} \quad \text{and} \quad \text{is} \quad \text{at} \quad \text{K}_c \quad \text{and} \quad \text{the} \quad \text{and} \quad \text{the} \quad \text{and} \quad \text{the} \quad \text{and} \quad \text{the}
\]

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 \( \text{CH}_3\text{COOH} = 4.8 \))

Options:
1. 9.2
1. 4.8
2. 8.4
3. 2.9

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. Mn\(^{2+}\), H\(_2\)
2. Mn\(^{2+}\), O\(_2\)
3. Mn\(^{2+}\), H\(_2\)
4. MnO\(_2\), 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. Li\(^+\)
2. Mg\(^{2+}\)
3. Na\(^+\)
4. K\(^+\)
The product(s) formed when borax dissolves in water is/are:

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

Identify the correct statement.

Options:
1. Non-directional covalent bonds are present throughout the crystal lattice of diamond.
2. Fullerenes are the pure forms of carbon
3. C–C bond length in the layer of graphite is 154 pm
4. Carbon monoxide is a water soluble gas
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 $X$?

శిత్పనిషి తూర్ణ యొక్క లక్షణానికి ఎదురు 1 ppm షాల కంపోష్ట్ తంబ కాహఙాలు

**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.

రెంటన్ కెసరికమైన ప్రాంతాలు, సంపదకం తంబను కచారులు నంపదు చేసాం నంపదు చేసాం

**Options:**

1. $\text{Fe}_4[\text{Fe(CN)}_6]_3$, Prussian blue, [Fe(CN)$_5$NOS]$^{4-}$, (NH$_4)_3$PO$_4$$\cdot$12MoO$_3$, Violet, Yellow
2. $\text{Fe}_4[\text{Fe(CN)}_6]_3$, Prussian blue, [Fe(SCN)$_2$]$^{2+}$, (NH$_4)_3$PO$_4$$\cdot$12MoO$_3$, Blood red, Violet
The number of electrophiles and nucleophiles present in the species given below are respectively.

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

Options:

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

C₂H₄ → dil KMnO₄ → B → dry HCl → D
C₃H₄ → Hg²⁺/H⁺ → C → HCl

Options:

1. 

2. 

3. 

4. 

In which of the following reactions alkane is not formed?

CH₃Br → Na/dry ether →

Options:
Question Number : 140  Question Id : 1874634620  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

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 °C  ಮೂಲು 0.305 ಹೆಕ್ಸೆನ್ ಮತ್ತು ಹೆಪ್ಟೇನ್ ರಾಷ್ಟ್ರಹಾರು, ಹೆಕ್ಸೆನ್ ಅಂಶದ ರಾಷ್ಟ್ರಹಾರು 95 bar. ಹೆಪ್ಟೇನ್ ರಾಷ್ಟ್ರಹಾರು 0.555. 30 °C  ಮೂಲು  ಹೆಪ್ಟೇನ್, ಹೆಪ್ಟೇನ್ ಅಂಶದ ರಾಷ್ಟ್ರಹಾರು 95 bar ೫೨

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

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

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 లో గోల్ సోల్ 30 mL లో 10% NaCl సాలారి సమాంతంలో నిషేధం చేయబడింది. ఈ నడుమత్తు పునరాతిని సంపన్న నిర్ధారించడానికే మామిడి హేమింమిన్ 30 mg ఎంపిక నిర్ధారించడానికే (హేమింమిన్ పునరాతి ఎంపిక 0.03)

Options :

0.3
1.

0.09
2.

0.03
3.

0.9
4.
In froth-floatation process what is the depressant used in the separation of sulphide ores of Zinc and Lead?

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.

Options:
1. Phosphonic acid

2. Phosphinic acid

3. Orthophosphoric acid
4. Identify the reaction in which SO₂ is not formed?

SO₂, ప్రత్యేక విధంగా ఎగుంపారు.

Options:
1. \( \text{Na}_2\text{SO}_3(\text{aq}) + \text{dil H}_2\text{SO}_4 \rightarrow \)
2. \( \text{Na}_2\text{SO}_3(\text{s}) + \text{浓 H}_2\text{SO}_4 \rightarrow \)
3. \( \text{S} + \text{O}_2(\text{o}) \text{air} \xrightarrow{\text{burn}} \)
4. \( \text{S} + \text{O}_2(\text{elect}) \xrightarrow{\text{燃尽}} \)
5. \( \text{S} + \text{浓 H}_2\text{SO}_4 \rightarrow \)
6. \( \text{S} + \text{浓 H}_2\text{SO}_4 \rightarrow \)
7. \( 2\text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \)

Question Number : 149  Question Id : 1874634629  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

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

ఎందుకు ప్రత్యేక విధంగా ఎగుంపలా ఉంటుంది?

Options:
1. \( \text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow \)
2. \( \text{XeF}_4 + \text{H}_2\text{O} \rightarrow \)
3. \( \text{XeF}_6 + \text{H}_2\text{O} \rightarrow \)
4. XeF₂ + H₂O →

The magnetic moment of which of the following complexes is maximum?

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

A metal ion \((\text{M}^{n+})\) forms octahedral \([\text{ML}_6]^{n+}\) and tetrahedral \([\text{ML}_4]^{n+}\) complexes with same ligand at different experimental conditions. The \(\Delta_0\) of \([\text{ML}_6]^{n+}\) is 3 eV. What is the energy in eV of e\(_g\) orbital of \([\text{ML}_4]^{n+}\) complex?

Options:
1. 4
2. 5
3. \[
\frac{8}{15}
\]

Question Number : 152  Question Id : 1874634632  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The catalyst triethyl aluminium and titanium tetrachloride finds use in the formation of the polymer

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

Question Number : 153  Question Id : 1874634633  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Match the following.

List - I  
A) Ascorbic acid  
B) Vitamin D  
C) Vitamin B₁  
D) Vitamin E

List - II  
I) Rickets  
II) Muscular weakness  
III) Convulsions  
IV) Amla  
V) Beri beri

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 sweetner

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

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

$$\text{C}_6\text{H}_5\text{N}_2\text{Cl} \xrightarrow{283^\circ\text{K}} \text{H}_2\text{O} \rightarrow \text{X} \xrightarrow{i) \text{CHCl}_3/\text{aq.} \text{NaOH}} \xrightarrow{\text{ii) \text{H}_3\text{O}^+}} \text{Y}$$

Options:

1. $\text{Cl, } -\text{C}=\text{CH}_3$

2. $\text{OH, } -\text{C}=\text{O}$

3. $\text{OH, } -\text{C}=\text{O}$

4. $\text{Cl, } -\text{O}-\text{C}-\text{CH}_3$

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

Options:

1. CO, HCl, anhydrous AlCl$_3$; KMnO$_4$; LiAlH$_4$
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. R CH(OH) R, R CH₂OH, R CH₂OH

2. R CH₂OH, R CH(OH) R, R CH₂OH

3. R CH₂OH, R CH₂OH, R₂CHOH

4. R₂CH OH, R CH₃, R CH₂OH
A carbonyl compound ‘A’ (C₈H₇O) 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’?

అంతర్జాల రాసించిన ‘A’ (C₈H₇O) సమర్పణంలో లేపించిన భాగాన్ని మృదు క్రమంలో మృదు భాగం క్రమంలో మృదు భాగం ఈమానా సమర్పణంలో లేపించిన ‘B’ సమర్పణం. తరువాత మృదు భాగం మృదు భాగం ఈమానా సమర్పణంలో లేపించిన ‘C’ సమర్పణం. ‘A’ మృదు భాగం ‘C’ మృదు భాగం?

Options:

1. ‘A’
   
   ![Chemical structure](image1)

   ‘C’
   
   ![Chemical structure](image2)

2. ‘A’
   
   ![Chemical structure](image3)

   ‘C’
   
   ![Chemical structure](image4)

3. ‘A’
   
   ![Chemical structure](image5)

   ‘C’
   
   ![Chemical structure](image6)

4. ‘A’
   
   ![Chemical structure](image7)

   ‘C’
   
   ![Chemical structure](image8)
What is $Y$ in the following reaction sequence?

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

Options:

1. 

2. 

3. 

4.