Mathematics

Display Number Panel: Yes
Group All Questions: No

Question Number: 1  Question Id: 1874634641  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
Match the following

List - I
A) \( f: \mathbb{R} \to \mathbb{R} \) is such that
\[ f(x) = px + q, \quad (p \neq 0) \quad \forall \ x \in \mathbb{R} \]
B) \( f: \mathbb{R} \to \mathbb{R}^+ \cup \{0\} \) is such that
\[ f(x) = x^2 \quad \forall \ x \in \mathbb{R} \]
C) \( f: \mathbb{N} \to \mathbb{N} \) is such that
\[ f(n) = n^2 + 2n + 3 \quad \forall \ n \in \mathbb{N} \]
D) \( f: \mathbb{R} \to \mathbb{R} \) is such that
\[ f(x) = 2 (\cos^2 5x + \sin^2 5x) \quad \forall \ x \in \mathbb{R} \]

List - II
I) \( f \) is neither one-one nor onto
II) \( f \) is both one-one and onto
III) \( f \) is one-one but not onto
IV) \( f \) is onto but not one-one
V) \( f \) is a constant function and also a bijection

Options:

1. A B C D

2. A B C D
Question Number : 2  Question Id : 1874634642  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The range of \( f(x) = \sqrt{\frac{a-x}{(a+1)-x}} \), \( (a > 0) \) is

\[ f(x) = \sqrt{\frac{a-x}{(a+1)-x}} \), \( (a > 0) \]

Options :

1. \([0, a]\)

2. \([0, \infty) \cup [-\sqrt{\frac{a}{a+1}}, \sqrt{\frac{a}{a+1}}]\]

3. \([0, \sqrt{\frac{a}{a+1}}] \cup (1, \infty)\]

4. \([0, \sqrt{\frac{a}{a+1}} + 1]\)

Question Number : 3  Question Id : 1874634643  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( 2 \cdot 4^{2k+1} + 3^{3k+1} = 11t \) and \( 2 \cdot 4^{2k+3} + 3^{3k+4} = 11( pt + 3^q ) \), where \( k, t \in \mathbb{Z}^+ \), then \((p, q) = \)

\[ k, t \text{  ಜ್ಜೆಸ್ಟಿರುತ್ತದೆ ಇಂತಹಾರು ಹೇಸೆಹೆಸೆಹೆಸೆ 2 \cdot 4^{2k+1} + 3^{3k+1} = 11t \text{  ಹೆಸೆಹೆಸೆಹೆಸೆ 2 \cdot 4^{2k+3} + 3^{3k+4} = 11( pt + 3^q ) \text{  ಹೆಸೆಹೆಸೆಹೆಸೆ (p, q) =} \]

Options :
The equation obtained by eliminating $a, b, c$ from the equations

\[ x = \frac{a}{b-c}, \quad y = \frac{b}{c-a}, \quad z = \frac{c}{a-b} \]

is

\[ x = \frac{a}{b-c}, \quad y = \frac{b}{c-a}, \quad z = \frac{c}{a-b} \]

Options:

1. \[ \begin{vmatrix} 1 & -x & x \\ 1 & -y & y \\ 1 & -z & z \end{vmatrix} = 0 \]

2. \[ \begin{vmatrix} 1 & -x & x \\ 1 & 1 & -y \\ 1 & z & 1 \end{vmatrix} = 0 \]

3. \[ \begin{vmatrix} 1 & -x & x \\ y & 1 & -y \\ -z & z & -1 \end{vmatrix} = 0 \]

4. \[ \begin{vmatrix} x & y & 1 \\ y & x & 1 \\ 1 & x & y \end{vmatrix} = 0 \]
Question Number : 5  Question Id : 1874634645  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\text{If } A \text{ is a } 3 \times 3 \text{ matrix and } |A| = 2, \text{ then } |\text{Adj (Adj } A)| = \text{ Adj(Adj } A) =
\]

\[
A = 3 \times 3 \text{ 矩阵 } \text{ 其行列式 } |A| = 2 \text{ 以及 } |\text{Adj (Adj } A)| = \text{ Adj(Adj } A) =
\]

Options :
1. 32A
2. 64A
3. 16A
4. 8A

Question Number : 6  Question Id : 1874634646  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\text{If } x = \alpha, y = \beta, z = \gamma \text{ is the solution, for the system of equations}
\]

\[
\begin{align*}
2x - y + 8z &= 13 \\
3x + 4y + 5z &= 18 \\
5x - 2y + 7z &= 20
\end{align*}
\]

then \( \alpha\beta + \beta\gamma + \gamma\alpha = \)

\[
\begin{align*}
2x - y + 8z &= 13 \\
3x + 4y + 5z &= 18 \\
5x - 2y + 7z &= 20 \text{ 常数 } \text{ 系数} & \text{ 贝尔曼方程}
\end{align*}
\]

\[
x = \alpha, y = \beta, z = \gamma \text{ 解为方程, 所以 }
\]

\[
\alpha\beta + \beta\gamma + \gamma\alpha =
\]

Options :
1. 1
2. 0
3. 7
4. \(-3\)

For a complex number \(Z = a + ib\), let \(\hat{Z} = b + ia\). If \(Z_1, Z_2\) are such complex numbers, then
\[
\overline{Z_1Z_2} =
\]

Options:
1. \(\hat{Z}_1 \hat{Z}_2\)
2. \(\hat{Z}_1 \overline{Z}_2\)
3. \(\overline{Z}_1 \hat{Z}_2\)
4. \(\hat{Z}_1 Z_2\)

The points in the Argand plane represented by the complex conjugates of
\(1 + 2i, 2 - 3i, 3 - 4i\)

Options:
- are collinear
- form an equilateral triangle
form an obtuse angled triangle
3.
form an acute angled triangle
4.

Question Number : 9  Question Id : 1874634649  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If $1, \alpha_1, \alpha_2, \ldots, \alpha_{n-1}$ are the $n^{th}$ roots of unity and $n$ is an even natural number, then

$$(1+\alpha_1)(1+\alpha_2) \ldots (1+\alpha_{n-1}) =$$

1, $\alpha_1, \alpha_2, \ldots, \alpha_{n-1}$ ఎంటి నంది ని సమత్వంగా ప్రత్యేకం, $n$ ఎంటి ఇది సమానమైన సమీపులు,

$$(1+\alpha_1)(1+\alpha_2) \ldots (1+\alpha_{n-1}) =$$

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

Question Number : 10  Question Id : 1874634650  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If $\frac{1}{x} = 2 \sin \alpha$ and $\frac{1}{y} = 2 \cos \beta$, then $x^3 y^3 + \frac{1}{x^3 y^3} =$

$\frac{1}{x} = 2 \sin \alpha$ ఎంటి సమత్వం, $\frac{1}{y} = 2 \cos \beta$ ఎంటి, అందువల్ల $x^3 y^3 + \frac{1}{x^3 y^3} =$

Options :
1. $2 \cos 3(\beta - \alpha)$
2. $2 \cos 3(\beta + \alpha)$
3. \[2 \sin 3(\beta - \alpha)\]

4. \[2 \sin 3(\beta + \alpha)\]

Question Number : 11  Question Id : 1874634651  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If the product of the roots of the equation \[x^2 + 4kx + 12e^{3\log k} - 1 = 0, \ (k > 0)\] is 323, then the sum of its roots is

\[x^2 + 4kx + 12e^{3\log k} - 1 = 0, \ (k > 0)\] అదే రాశి లింగాల సమీప వ్యాఖ్య నంది కంటే 323 అవసరం, తదే
వచ్చిన పాటించండి

Options :
1. \[9k\]
2. 12
3. -12
4. -16k

Question Number : 12  Question Id : 1874634652  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \(a\) and \(b\) are the maximum and minimum values of the quadratic expressions \(1 - 2x - 5x^2\) and \(x^2 - 2x + 5\) respectively, then the set of all values of \(x\) for which the expression \(5ax^2 + bx + 7\) is positive, is

\(a, b\) అత్యంత సరిహద్దుడులు 1 - 2x - 5x^2 మహోంధు x^2 - 2x + 5 అత్యంత నుండి పెద్ద సరిహద్దుడు వచ్చిన పంపినీ, 5ax^2 + bx + 7 అత్యంత పెద్ద సరిహద్దుడు వచ్చిన పంపినీ x నంది

Options :
1. \((a, b)\)
2. \((-\infty, 7)\)
3. \((5, \infty)\)
4. \( (-\infty, \infty) \)

**Question Number : 13  Question Id : 1874634653  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical**

If \( \left| \frac{x^2 + kx + 1}{x^2 + x + 1} \right| < 3 \) for all real numbers \( x \), then the range of the parameter \( k \) is

\( \text{ప్రతియే ప్రత్యేకంగా ఎక్కడు లేదు} \frac{x^2 + kx + 1}{x^2 + x + 1} < 3 \) మొదటి, మొదటి \( k \) ఉప్పు, మొదటి

**Options :**

1. \((0, 4)\)
2. \((-1, 5)\)
3. \((-4, 0)\)
4. \((-5, 1)\)

**Question Number : 14  Question Id : 1874634654  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical**

Let \( a, b, c, d \in \mathbb{R} \). If the equations \( 2bx^2 + 3cx - d = 0 \) and \( 2ax^2 + 3bx + 4c = 0 \) have a common root and \( \frac{4bc + ad}{k(b^2 - ac)} = \frac{bd + 4c^2}{4bc + ad} \), then \( k = \)

\( a, b, c, d \in \mathbb{R} \) అవిభాగించడం లేదు. అందువల ద్వారా \( 2bx^2 + 3cx - d = 0 \), \( 2ax^2 + 3bx + 4c = 0 \) అయితే \( k \)

\( \frac{4bc + ad}{k(b^2 - ac)} = \frac{bd + 4c^2}{4bc + ad} \) మొదటి, మొదటి \( k = \)

**Options :**

1. \( \frac{9}{2} \)
2. \( \frac{2}{1} \)
If all the letters of the word REPEAT are permuted in all possible ways and if the six letter permutations thus formed are arranged in the dictionary order, then the rank of the word REPEAT is 

Options:
1. 133
2. 267
3. 266
4. 132

15 persons are sitting around a circular table. The number of ways of selecting three persons at a time from them, such that the selected three did not sit together at one place is

Options:
1. 455
Question Number : 17  Question Id : 1874634657  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the coefficients of \( r \)th and \( (r+1) \)th terms in the expansion of \((1 + x)^{24}\) are in the ratio 12 : 13, then \( r \) is the root of the quadratic equation

\[(1 + x)^{24} \text{ ఉపాధ్యాయం లో ఎవరు} \ (r+1) \text{ ఉపాధ్యాయం లో ఎవరు} \ \text{ కలిగివుంటాం} \ 12 : 13 \ \text{ఎంపికలా కాంతి,} \ \\
\text{అందులో} \ r \ \text{ను మూలం కలిగివుంటాం కారణం రెండు ప్రాంతాలు తెలుస్తాం}

Options:
1. \( x^2 - 5x + 6 = 0 \)
2. \( x^2 - 11x + 30 = 0 \)
3. \( x^2 - 14x + 13 = 0 \)
4. \( x^2 - 14x + 24 = 0 \)

Question Number : 18  Question Id : 1874634658  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( x = \frac{2}{5} + \frac{1}{2!} \left( \frac{2}{5} \right)^2 + \frac{1}{3!} \left( \frac{2}{5} \right)^3 + \ldots \), then \( x + \frac{1}{x} = \)

\( x = \frac{2}{5} + \frac{1}{2!} \left( \frac{2}{5} \right)^2 + \frac{1}{3!} \left( \frac{2}{5} \right)^3 + \ldots \) అంకె తెలుస్తుంది, \( x + \frac{1}{x} = \)

Options:
1. \( \frac{1 + \sqrt{5}}{4} \)
The coefficient of $x^4$ in the expansion of $\frac{1}{(1-x)(1-2x)(1-3x)}$ is

\[
\frac{1}{(1-x)(1-2x)(1-3x)}
\]

Options:
1. 602
2. 301
3. $\frac{601}{2}$
4. 302

If $\tan A - \tan B = x$ and $\cot A - \cot B = y$, then $\cot(A - B) =$

\[
\frac{\tan A - \tan B = x}{\cot A - \cot B = y}
\]

Options:
1. $\frac{xy}{x + y}$
2. \( \frac{xy}{x - y} \)

3. \( \frac{x - y}{xy} \)

4. \( \frac{y - x}{xy} \)

Question Number : 21  Question Id : 1874634661  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\tan \frac{\pi}{5} + 2 \tan \frac{2\pi}{5} + 4 \cot \frac{4\pi}{5} =
\]

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

Question Number : 22  Question Id : 1874634662  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \sin x + \sin y = \frac{\sqrt{3} + 1}{2} \) and \( \cos x + \cos y = \frac{\sqrt{3} - 1}{2} \), then

\[
\tan^2 \left( \frac{x - y}{2} \right) + \tan^2 \left( \frac{x + y}{2} \right) =
\]

\[
\sin x + \sin y = \frac{\sqrt{3} + 1}{2} \quad \text{and} \quad \cos x + \cos y = \frac{\sqrt{3} - 1}{2} \quad \text{also,}\quad \text{also}
\]

\[
\tan^2 \left( \frac{x - y}{2} \right) + \tan^2 \left( \frac{x + y}{2} \right) =
\]
In \( \triangle PQR \), let \( |P| > |Q| \). If the radian measures of \( |P| \) and \( |Q| \) satisfy the equation 
\[
4 \sin^3 x - 3 \sin x + a = 0, \quad 0 < a < 1,
\]
then the radian measure of \( |R| \) is

\[
\Delta PQR \text{ so } |P| > |Q| \text{ అని ప్రకారం. } |P| > |Q| 	ext{ అనికి } 4 \sin^3 x - 3 \sin x + a = 0, \quad 0 < a < 1 \text{ లేదా } |R| 	ext{ అని } \frac{\pi}{3} 	ext{ ఉండాం}
\]

Options:
1. \( \frac{\pi}{3} \)
2. \( \frac{\pi}{2} \)
3. \( \frac{2\pi}{3} \)
4. \( \frac{5\pi}{6} \)

The solution of the equation \( \sin^{-1} x + \sin^{-1} 2x = \frac{\pi}{3} \) is

\[
\sin^{-1} x + \sin^{-1} 2x = \frac{\pi}{3} \text{ లేదా } \sin^{-1} x + \sin^{-1} 2x = \frac{\pi}{3}
\]
If $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$, then $\log\left(\tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)\right) =$

$\frac{-\pi}{2} < \theta < \frac{\pi}{2}$  savarā, savarā $\log\left(\tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)\right) =$

Options:

1. $\tanh^{-1}\left(\tan\frac{\theta}{2}\right)$

2. $2\tanh^{-1}\left(\tan\frac{\theta}{2}\right)$

3. $\coth^{-1}\left(\tan\frac{\theta}{2}\right)$

4. $2\coth^{-1}\left(\tan\frac{\theta}{2}\right)$
If \(ABC\) is a right angled triangle with \(90^\circ\) at \(C\) and \(a > b\), then \(\frac{a^2 + b^2}{a^2 - b^2} \sin(A - B) = \)

\[\frac{a^2 + b^2}{a^2 - b^2} \sin(A - B) = \]

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

---

\(a, b, c\) are the sides of a scalene triangle \(ABC\). If angles \(\alpha, \beta, \gamma\) lie between 0 and \(\pi\) such that

\[\cos \alpha = \frac{a}{b + c}, \quad \cos \beta = \frac{b}{c + a} \quad \text{and} \quad \cos \gamma = \frac{c}{a + b}, \quad \text{then} \quad \tan^2 \frac{\alpha}{2} + \tan^2 \frac{\beta}{2} + \tan^2 \frac{\gamma}{2} = \]

\[\tan^2 \frac{\alpha}{2} + \tan^2 \frac{\beta}{2} + \tan^2 \frac{\gamma}{2} = \]

Options :
1. \(\frac{1}{3}\)
2. 2
In triangle ABC, if \( r_1 = 36 \), \( r_2 = 18 \) and \( r_3 = 12 \), then \( a + b = \)

\[ r_1 = 36, r_2 = 18, r_3 = 12 \text{ అంకే, అంకే } a + b = \]

Options:
1. 36
2. 24
3. 30
4. 54

If \( \alpha, \beta, \gamma \) are distinct real numbers and \( \alpha + \beta + \gamma \neq 0 \), then the points with position vectors \( \alpha \overrightarrow{i} + \beta \overrightarrow{j} + \gamma \overrightarrow{k} \), \( \beta \overrightarrow{i} + \gamma \overrightarrow{j} + \alpha \overrightarrow{k} \) and \( \gamma \overrightarrow{i} + \alpha \overrightarrow{j} + \beta \overrightarrow{k} \) are collinear.

Options:
1. collinear

vertices of a scalene triangle

2. సమాధానాంతరం మధ్య కోను దృష్టి
vertices of an isosceles triangle

vertices of an equilateral triangle

Given three vectors \( \vec{a} = 2\vec{i} - \vec{j} + \vec{k}, \ \vec{b} = \vec{i} + 2\vec{j} - \vec{k} \) and \( \vec{c} = \vec{i} + \vec{j} - 2\vec{k} \), a vector in the plane of \( \vec{b} \) and \( \vec{c} \) whose projection on \( \vec{a} \) is of magnitude \( \sqrt{\frac{2}{3}} \) is

\[
\vec{a} = 2\vec{i} - \vec{j} + \vec{k}, \ \vec{b} = \vec{i} + 2\vec{j} - \vec{k} \text{ and } \vec{c} = \vec{i} + \vec{j} - 2\vec{k} \text{ can be, } \vec{b} \\
\text{one of the choices is, } \vec{b} \text{ and } \vec{c} \text{ both have magnitude } \sqrt{\frac{2}{3}} \text{ and the other two have magnitude } \sqrt{\frac{2}{3}} \text{ or less.}
\]

Options:
1. \( -2\vec{i} - \vec{j} + 5\vec{k} \)
2. \( 2\vec{i} + 3\vec{j} + 3\vec{k} \)
3. \( 2\vec{i} + \vec{j} + 5\vec{k} \)
4. \( 2\vec{i} - 3\vec{j} + 3\vec{k} \)

\( \vec{a} = 3\vec{i} + \vec{j} - \vec{k}, \ \vec{b} = -\vec{i} - 4\vec{j} + 5\vec{k}, \ \vec{c} = 4\vec{i} + 5\vec{j} - \vec{k} \) are three vectors and a vector \( \vec{r} \) is perpendicular to both the vectors \( \vec{b} \) and \( \vec{c} \). If \( \vec{r} \cdot \vec{a} = 9 \), then \( \vec{r} = \)

\[
\vec{a} = 3\vec{i} + \vec{j} - \vec{k}, \ \vec{b} = -\vec{i} - 4\vec{j} + 5\vec{k}, \ \vec{c} = 4\vec{i} + 5\vec{j} - \vec{k} \text{ are such that the \( \vec{r} \) vector is }
\]

\( \vec{b}, \vec{c} \text{ and have magnitude equal to } \sqrt{\frac{2}{3}}. \ \vec{r} \cdot \vec{a} = 9 \text{ and hence, the vector } \vec{r} = \)

Options:
$3(\mathbf{i} - \mathbf{j} - \mathbf{k})$

$3(\mathbf{i} - \mathbf{j} + \mathbf{k})$

$9(\mathbf{i} - \mathbf{j} - \mathbf{k})$

$9(\mathbf{i} - \mathbf{j} + \mathbf{k})$

Question Number : 32  Question Id : 1874634672  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

$\mathbf{AB} = \mathbf{a}$ and $\mathbf{AC} = \mathbf{b}$ are the sides of a $\Delta ABC$. $P$ is a point on $\mathbf{AB}$ and $Q$ is a point on $\mathbf{BC}$ such that $\frac{\mathbf{AP}}{\mathbf{PB}} = \frac{1}{2}$ and $\frac{\mathbf{BQ}}{\mathbf{QC}} = \frac{1}{2}$. If the point of intersection of $\mathbf{AQ}$ and $\mathbf{CP}$ is $D$ and the area of $\Delta BCD$ is 7 square units, then the area of the $\Delta ABC$ (in the same sq.units) is

$\mathbf{AB} = \mathbf{a}$ అంటే $\mathbf{AC} = \mathbf{b}$ అంటే $\Delta ABC$ చతుర్భుజం, కానీ $\frac{\mathbf{AP}}{\mathbf{PB}} = \frac{1}{2}$ అంటే $\frac{\mathbf{BQ}}{\mathbf{QC}} = \frac{1}{2}$ అంటే విశ్లేషించండి $\mathbf{AB}$ యొక్క ప్రాంతం $\mathbf{BC}$ యొక్క ప్రాంతం $\mathbf{Q}$ యొక్క ప్రాంతం $\mathbf{CP}$ యొక్క ప్రాంతం $\mathbf{D}$ యొక్క ప్రాంతం $\Delta BCD$ చతుర్భుజం 7 చతుర్భుజం చతుర్భుజం చతుర్భుజం (వ్యవస్థ అనుపాతాలు)

Options :
1. $\frac{49}{4}$
2. $\frac{49}{2}$
3. $\frac{7}{2}$
4. $\frac{7}{4}$
If \( \vec{a} = \vec{i} + \vec{j} + \vec{k} \), \( \vec{b} = \vec{i} + \vec{j} + 2\vec{k} \) and \( \vec{c} = 2\vec{i} + 3\vec{j} + 4\vec{k} \) then the magnitude of the projection on \( \vec{c} \) of a unit vector that is perpendicular to both \( \vec{a} \) and \( \vec{b} \) is

\[
\vec{a} = \vec{i} + \vec{j} + \vec{k}, \quad \vec{b} = \vec{i} + \vec{j} + 2\vec{k}, \quad \vec{c} = 2\vec{i} + 3\vec{j} + 4\vec{k}
\]

Options:

1. \[ \frac{1}{\sqrt{29}\sqrt{3}} \]
2. \[ \frac{1}{\sqrt{6}} \]
3. \[ \frac{1}{\sqrt{58}} \]
4. \[ \frac{3}{29} \]

If \( \vec{a}, \vec{b}, \vec{c} \) are three unit vectors such that \( \vec{a} \times (\vec{b} \times \vec{c}) = \frac{\sqrt{3}}{2} \vec{b} + \frac{1}{2} \vec{c} \), then the angles between \( \vec{a}, \vec{b} \) and \( \vec{a}, \vec{c} \) respectively are

\[
\vec{a} \times (\vec{b} \times \vec{c}) = \frac{\sqrt{3}}{2} \vec{b} + \frac{1}{2} \vec{c}
\]

Options:

1. \( 60^\circ, 30^\circ \)
2. \( 120^\circ, 30^\circ \)
The variance of the following data is

<table>
<thead>
<tr>
<th>$x_i$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f_i$</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Options:
1. 10
2. 9
3. 8
4. 6

The coefficient of variation of the following distribution is

<table>
<thead>
<tr>
<th>Class interval</th>
<th>0-5</th>
<th>5-10</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>4</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Options:
$\frac{25\sqrt{139}}{12}$
2. \[
\frac{25}{6}
\]

3. \[
\frac{139}{6}
\]

4. \[
\frac{25 \times 139}{12}
\]

**Question Number : 37 Question Id : 1874634677 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

From a group of 50 students, two sections comprising of 20 and 30 students are formed. If Ram and Rahim are two particular students among the 50 students, then the probability that they both belong to the same section is

50 కంటే విభాగాల కంటే మినియన్ 20 కంటే 30 కంటే విభాగాల కంటే మినియన్ విభాగాల. 50 కంటే విభాగాల మినియన్, 20 కంటే 30 కంటే విభాగాల విభాగాల విభాగాల, అంటే 20 కంటే 30 కంటే మినియన్ విభాగాల మినియన్ విభాగాలకు మినియన్

**Options :**

1. \[
\frac{25}{49}
\]

2. \[
\frac{12}{23}
\]

3. \[
\frac{13}{23}
\]

4. \[
\frac{24}{49}
\]

**Question Number : 38 Question Id : 1874634678 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**
If $E_1$ and $E_2$ are two events of a random experiment such that $P(E_1) = \frac{1}{8}$, $P(E_1|E_2) = \frac{1}{3}$, $P(E_2|E_1) = \frac{1}{4}$, then match the items of List - I with the items of List - II.

$P(E_1) = \frac{1}{8}$, $P(E_1|E_2) = \frac{1}{3}$, $P(E_2|E_1) = \frac{1}{4}$ 

List - I
A) $P(E_2)$
B) $P(E_1 \cup E_2)$
C) $P(\overline{E}_1 \cap \overline{E}_2)$
D) $P(E_1|\overline{E}_2)$

List - II
I) $\frac{3}{16}$
II) $\frac{3}{29}$
III) $\frac{3}{32}$
IV) $\frac{26}{29}$
V) $\frac{13}{32}$

The correct match is
A) B) C) D)
1. I) III) IV) II)
2. III) I) IV) V)
3. III) I) IV) II)
Question Number : 39  Question Id : 1874634679  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  
Single Line Question Option : No  Option Orientation : Vertical

A Box B₁ contains 3 blue balls and 6 red balls. Another Box B₂ contains 8 blue balls and \( n \) red balls \( (n \in \mathbb{N}) \). A ball selected at random from a box is found to be red. If \( p \) is the probability that this red ball drawn is from box B₂, then

\[ B₁ \text{ contains } 3 \text{ blue balls and 6 red balls. } \]
\[ B₂ \text{ contains } 8 \text{ blue balls and } n \text{ red balls. } \]

\[ p = \frac{1}{7} \leq p < \frac{3}{5} \]

Options :
1. \[ \frac{3}{5} \leq p < 1 \]
2. \[ 0 < p \leq \frac{3}{5} \]
3. \[ 0 \leq p \leq \frac{1}{7} \]

Question Number : 40  Question Id : 1874634680  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  
Single Line Question Option : No  Option Orientation : Vertical

From a bag containing 4 white and 5 red balls, if 3 balls are drawn at random, then the mean of the number of red balls among the balls drawn, is

4 తలపు, 5 కంటే పరిమితి కలిగి 3 మధ్య సంఖ్య విభజించిన ఫిసి సంఖ్య విభజించిన ఫిసి విభజించిన ఫిసి విభజించిన ఫిసి

Options :
If the mean of a Poisson variate $X$ is 1, then

$$\sum_{r=0}^{\infty} (r-1)P(X = r) =$$

Options:

1. $1$
2. $0$
3. $\frac{2}{e}$
4. $\frac{1}{e}$
A line moves such that the portion of it intercepted between the coordinate axes is of constant length $a$, then the locus of the mid point of that line segment is

\[ \frac{x^2}{4} + \frac{y^2}{4} = a^2 \]

1. $x^2 + y^2 = a^2$
2. $x^2 + y^2 = \frac{a^2}{4}$
3. $x^2 + y^2 = \frac{a^2}{2}$

If $(h, k)$ be the point to which the origin has to be shifted in order to get the transformed equation of $y^2 - 4x + 6y + 17 = 0$ as $y^2 = 4ax$, then $h^2 + k^2 =$

\[ y^2 - 4x + 6y + 17 = 0 \text{ అయితే, మార్పిడి సమీపాన్ని } y^2 = 4ax లో రాసిన మిస్సింగ్ సమీపాన్ని (h, k) అడుగు వేసి మార్పిడి సమీపాన్ని, h^2 + k^2 =

Options:
1. 11
2. 1
3. 25
4. 13
The intercept form of the equation of the straight line passing through the point \((4, -3)\) and perpendicular to the line passing through the points \((1, 1)\) and \((2, 3)\) is

\[
\frac{x - 4}{1} = \frac{y + 3}{1}
\]

1.

\[
\frac{x}{-2} + \frac{y}{-1} = 1
\]

2.

\[
\frac{x}{8} - \frac{y}{6} = 1
\]

3.

\[
\frac{x}{1} + \frac{y}{1} = 1
\]

4.

If \(x + 2y - 3 = 0, 3x + 4y - 7 = 0, 2x + 3y - 4 = 0\) and \(4x + 5y - 6 = 0\) are the equations of four lines, then

\[
x + 2y - 3 = 0, 3x + 4y - 7 = 0, 2x + 3y - 4 = 0 \text{ and } 4x + 5y - 6 = 0 \text{ are the sides of a square}
\]

Options:

1. they are the sides of a square

\[
\text{they are the sides of a square}
\]

1.

2. they are all concurrent lines

\[
\text{they are all concurrent lines}
\]

2.
they are the sides of a parallelogram

\[ \text{not all of them are concurrent} \]

Options:

1. 3
2. 1
3. -1
4. -3

---

Two equal sides of an isosceles triangle are given by \(7x - y + 3 = 0\) and \(x + y - 3 = 0\). If the slope \(m\) of the third side is an integer, then \(m = \)

\[ \text{Options:} \]

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

---

The pair of lines \(lx^2 + 2(l + m)xy + my^2 = 0\) lies along two diameters of a circle and divides the circle into 4 sectors. If the area of bigger sector is 5 times the area of smaller sector, then \(\frac{lm}{(l+m)^2} = \)

\[ \text{Options:} \]

1. \(\frac{5}{(l+m)^2}\)
2. \(\frac{10}{(l+m)^2}\)
3. \(\frac{15}{(l+m)^2}\)
4. \(\frac{20}{(l+m)^2}\)
Question Number : 48  Question Id : 1874634688  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The line $3x + 4y - 5 = 0$ cuts the curve $2x^2 + 3y^2 = 5$ at A and B. If ‘O’ is the origin, then $\angle AOB = \frac{3x + 4y - 5 = 0}{2x^2 + 3y^2 = 5}$

Options :

1. $\frac{\pi}{6}$

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

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

4. $\frac{\pi}{8}$

Question Number : 49  Question Id : 1874634689  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The centre of the circle which passes through the vertices of the triangle formed by the lines $y = 0, y = x$ and $2x + 3y = 10$, is

$y = 0, y = x \text{ and } 2x + 3y = 10$.

Options:

1. $\left(-\frac{5}{2}, -\frac{1}{2}\right)$
2. $\left(\frac{5}{2}, -\frac{1}{2}\right)$
3. $\left(-\frac{1}{2}, -\frac{1}{2}\right)$
4. $\left(\frac{5}{2}, \frac{1}{2}\right)$

The distance between the polar of $P (2, 3)$ with respect to the circle $x^2 + y^2 - 2x - 2y + 1 = 0$ and the polar of the inverse point of $P$ with respect to the same circle is

$x^2 + y^2 - 2x - 2y + 1 = 0$.

Options:

1. $0$
2. $\frac{4}{\sqrt{5}}$
3. $\frac{12}{\sqrt{5}}$
A circle \( S \) of radius 2 units lies in the first quadrant and touches both the coordinate axes. The equation of the circle with centre at \((6, 5)\) and touching the circle \( S \) externally is

\[
2 \text{ తొరిఫించే క్రిందియంది కాబు కావచ్చు } S, \text{ మాట్లాడడానికి} \text{ కావు కావచ్చు నిర్మాణాది కానించాడు. (6, 5) కేంద్రం ఉండే క్రిందియం కావచ్చు క్రిందియం కావచ్చు నిర్మాణం}
\]

Options:

1. \(x^2 + y^2 - 12x - 10y + 12 = 0\)

2. \(x^2 + y^2 - 12x - 10y - 20 = 0\)

3. \(x^2 + y^2 - 12x - 10y + 25 = 0\)

4. \(x^2 + y^2 - 12x - 10y + 52 = 0\)

If the circles \((x + a)^2 + (y + b)^2 = a^2\) and \((x + c)^2 + (y + d)^2 = d^2\) cut orthogonally, then

\[
b(b - 2d) = \]

\[
(x + a)^2 + (y + b)^2 = a^2 \text{ కాబు కావచ్చు } (x + c)^2 + (y + d)^2 = d^2 \text{ కాబు కావచ్చు మాట్లాడడానికి} \text{ నిర్మాణం}
\]

Options:

1. \(c(c - 2a)\)

2. \(c(2a - c)\)

3. \(d(2c - a)\)
Question Number : 53  Question Id : 1874634693  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation of the circle having the common chord of the circles \( x^2 + y^2 - 8x = 0 \) and \( x^2 + y^2 - 9 = 0 \) as its diameter is

\[
x^2 + y^2 - 8x = 0 \quad \text{and} \quad x^2 + y^2 - 9 = 0 \]

Options :

1. \( x^2 + y^2 - 72x - 207 = 0 \)
2. \( x^2 + y^2 + 72x + 207 = 0 \)
3. \( 32x^2 + 32y^2 - 72x - 207 = 0 \)
4. \( 32x^2 + 32y^2 + 72x - 207 = 0 \)

Question Number : 54  Question Id : 1874634694  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The parametric equations of the parabola \( y^2 - 8x - 4y - 12 = 0 \) are

\[
y^2 - 8x - 4y - 12 = 0 \]

Options :

1. \( x = 2 + 2t^2, \ y = -2 + 4t \)
2. \( x = 2 + 4t, \ y = -2 + 2t^2 \)
3. \( x = -2 + 2t, \ y = 2 + 4t \)
4. \( x = -2 + 4t, \ y = 2 + 2t^2 \)
For any non-zero real value of \( m \), the equation of the parabola to which the line \( mx - y + 10 + m^2 = 0 \) is a tangent, is

\[ x^2 = y - 10 \]

1.

\[ y^2 = 4(x - 2) \]

2.

\[ x^2 = -4(y - 10) \]

3.

\[ x^2 = -4y \]

4.

The ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) (\( a > b \)) and the parabola \( y^2 = 4ax \) cut at right angles. If \( e \) is the eccentricity of the ellipse, then \( 2e^2 = \)

\[ \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \]

\( a > b \)

\( y^2 = 4ax \)

\( e \) is the eccentricity of the ellipse.

\[ 2e^2 = \]

Options:

1.

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

2.

\[ \frac{1}{8} \]

3.
Let a tangent drawn at any point on the ellipse \( \frac{x^2}{25} + \frac{y^2}{16} = 1 \) cut the X-axis at \( Q \). Let \( R \) be the image of \( Q \) with respect to \( y = x \). If \( S \) is a circle with \( QR \) as its diameter, then the fixed point through which the circle \( S \) passes is

\[
\frac{x^2}{25} + \frac{y^2}{16} = 1
\]

Options:
1. (5, 4)
2. (4, 5)
3. (0, 0)
4. (0, 5)

If the normals drawn to the hyperbola \( xy = 4 \) at \( (\alpha_i, \beta_i) \) \((i = 1, 2, 3, 4)\) are concurrent at the point \((a, b)\), then \( \frac{(\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4)}{(\beta_1 + \beta_2 + \beta_3 + \beta_4)}(\alpha_1\alpha_2\alpha_3\alpha_4) = \)

\[
xy = 4 \text{ त्यमानमिश्रित } (\alpha_i, \beta_i) \text{ } (i = 1, 2, 3, 4) \text{ अर्थात् } (\alpha_1, \beta_1) \text{ तथा } (\alpha_4, \beta_4) \text{ तथापि } (a, b)
\]

Options:
Question Number : 59  Question Id : 1874634699  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The distance between the orthocentre and circumcentre of the triangle formed by the points 
(1, 2, 3), (3, -1, 5) and (4, 0, -3) is

(1, 2, 3), (3, -1, 5) ని చెందే (4, 0, -3) పట్టణం ఉన్న త్రిభుజం యొక్క మధ్యస్థ సమీపం నిశ్చితం చేయవచ్చు కండపై ఉండాలి

Options :

1. \(\frac{\sqrt{33}}{2}\)

2. \(\frac{\sqrt{31}}{2}\)

3. \(\frac{\sqrt{27}}{2}\)

4. \(\frac{\sqrt{23}}{2}\)

---

Question Number : 60  Question Id : 1874634700  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The direction cosines of the normal drawn to the plane passing through the points (2, -1, 5), (1, -3, 4), (5, 2, 1) are

\[(2, -1, 5), (1, -3, 4), (5, 2, 1)\] 

\[\frac{11}{\sqrt{179}}, \frac{-7}{\sqrt{179}}, \frac{3}{\sqrt{179}}\]

1. 

\[\frac{-9}{\sqrt{134}}, \frac{-7}{\sqrt{134}}, \frac{2}{\sqrt{134}}\]

2. 

\[\frac{11}{\sqrt{179}}, \frac{7}{\sqrt{179}}, \frac{-3}{\sqrt{179}}\]

3. 

\[\frac{9}{\sqrt{134}}, \frac{7}{\sqrt{134}}, \frac{-2}{\sqrt{134}}\]

4.

The equation of the plane \( \pi \) through the line of intersection of the planes \( \pi_1 \equiv x+3y-6 = 0 \), and \( \pi_2 \equiv 3x-y+4z = 0 \) is \( \pi_1 + \lambda \pi_2 = 0 \). If the plane \( \pi \) is at unit distance from the origin, then an equation of the plane \( \pi \) is

\( \pi_1 \equiv x+3y-6 = 0 \) మొదలో \( \pi_2 \equiv 3x-y+4z = 0 \) అవుతుంది, తిరిగి కొనసాగితే \( \pi_1 + \lambda \pi_2 = 0 \). అప్పుడు ప్రత్యేకించి కొనసాగితే \( \pi \), స్పూర్తి విశేషాంశాలు కలిగి, తదోత్సం \( \pi \\ మొదలో ఎండి నిష్టాలు

Options:

1. 

2. 

3. 

4. 

\[2x+y+2z-3 = 0\]

1. 

\[2x-y-2z+3 = 0\]

2.

\[2x+y+2z+3 = 0\]

3.
Let \([x]\) denote the greatest integer not exceeding \(x\).

\[
\text{If } l_1 = \lim_{x \to 2^+} \left( x^2 + [x] \right), \quad l_2 = \lim_{x \to 3^-} \left( 2x - [x] \right) \text{ and } l_3 = \lim_{x \to \frac{\pi}{2}} \left( \frac{\cos x}{x - \frac{\pi}{2}} \right), \text{ then}
\]

\[
x \not\equiv \frac{\pi}{2}
\]

\[
l_1 = \lim_{x \to 2^+} \left( x^2 + [x] \right), \quad l_2 = \lim_{x \to 3^-} \left( 2x - [x] \right) \text{ and } l_3 = \lim_{x \to \frac{\pi}{2}} \left( \frac{\cos x}{x - \frac{\pi}{2}} \right)
\]

Options:
1. \(l_2 < l_3 < l_1\)
2. \(l_1 < l_3 < l_2\)
3. \(l_1 < l_2 < l_3\)
4. \(l_3 < l_2 < l_1\)

If \(\lim_{x \to 0} \left[ \frac{(a-n)x - \tan x}{x^2} \right] \frac{\sin nx}{n} = 0, (n \neq 0)\) then the minimum possible positive value of \(a\) is

\[
\lim_{x \to 0} \left[ \frac{(a-n)x - \tan x}{x^2} \right] \frac{\sin nx}{n} = 0, (n \neq 0)
\]

Options:
If a function \( f \) is defined by:
\[
f(x) = \begin{cases} 
0, & \text{when } x = 1, \\
-x^3 + 1, & \text{when } 1 < x < \infty, \\
x - 1, & \text{when } -\infty < x < 1 \end{cases}
\]
then at \( x = 1 \), \( f \) is

Options:
1. continuous and differentiable
2. continuous but not differentiable
3. discontinuous and differentiable
4. discontinuous and not differentiable
Question Number : 65  Question Id : 1874634705  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \cos(f(x)) = \frac{1-x^2}{1+x^2} \) and \( \tan(g(x)) = \frac{3x-x^3}{1-3x^2} \), then \( \frac{df}{dg} = \)

\[
\cos(f(x)) = \frac{1-x^2}{1+x^2} \quad \text{and} \quad \tan(g(x)) = \frac{3x-x^3}{1-3x^2} \quad \Rightarrow \quad \text{Then,} \quad \frac{df}{dg} =
\]

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

---

Question Number : 66  Question Id : 1874634706  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( x^2 + y^2 = t - \frac{1}{t} \) and \( x^4 + y^4 = t^2 + \frac{1}{t^2} \), then \( \frac{dy}{dx} = \)

\[
x^2 + y^2 = t - \frac{1}{t} \quad \Rightarrow \quad \frac{d}{dt}(x^2 + y^2) = \frac{2x}{t} \quad \Rightarrow \quad \frac{dy}{dx} =
\]

Options :
1. \( \frac{2}{x^3} \)
2. \( \frac{2}{x^3 y} \)
3. \[ \frac{1}{x^3} \]

4. \[ \frac{1}{x^3 y} \]

**Question Number : 67  Question Id : 1874634707  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If \( x = \sin \theta \) and \( y = \cos p \theta \), then \((1 - x^2) y_2 = \)

\[ x = \sin \theta \] \( \therefore \) \( y = \cos p \theta \) \( \therefore \) \( (1 - x^2) y_2 = \)

**Options :**

1. \( xy_1 - p^2 y \)
2. \( p^2 y - xy_1 \)
3. \( xy_1 \)
4. \( p^2 y \)

**Question Number : 68  Question Id : 1874634708  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If \( T \) is the length of the subtangent drawn at any point on the curve \( 3y^2 = 4x^3 \) and \( N \) is the length of the subnormal at the same point, then \((3T)^2 = \)

\[ 3y^2 = 4x^3 \] \( \therefore \) \( \text{length of subtangent} \) \( \therefore \) \( \text{length of subnormal} \) \( \therefore \) \( T \) \( \therefore \) \( \therefore \) \( N \) \( \therefore \) \( \therefore \) \( \therefore \) \( (3T)^2 = \)

**Options :**

1. \( 4 N^2 \)
2. \( 4 N \)
3. \[ 2N \]
4. \[ 8N^2 \]

**Question Number : 69  Question Id : 1874634709  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The interval in which the function \( f(x) = \frac{\log(7+x)}{\log(3+x)} \) (\( x > 0 \)) decreases is

\[
f(x) = \frac{\log(7+x)}{\log(3+x)} \quad (x > 0)
\]

**Options :**
1. \( \left( 0, \frac{7}{3} \right) \)
2. \( \left( 0, \frac{3}{7} \right) \)
3. \( (0, 1) \)
4. \( (0, \infty) \)

**Question Number : 70  Question Id : 1874634710  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Let \( f \) be a polynomial function defined on \([2, 7]\). If \( f(2) = 3 \) and \( f'(x) \leq 5 \) for all \( x \) in \((2, 7)\), then the maximum possible value attained by \( f \) at \( x = 7 \) is

\[
f \in [2, 7] \quad \text{and} \quad f'(x) \leq 5 \quad \text{for all} \quad x \in (2, 7). \quad f(2) = 3 \quad \text{and} \quad f'(x) \leq 5 \quad \text{for all} \quad x \in (2, 7). \]

**Options :**
1. 7
2. 14
Question Number : 71  Question Id : 1874634711  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In the interval \([-2, 4]\), the absolute maximum of \(f(x) = 2x^3 - 3x^2 - 12x + 5\) occurs \(x = \) 

\([-2, 4]\) ఎంపయసి \(f(x) = 2x^3 - 3x^2 - 12x + 5\) కోసమా గోడు, అప్పట్టుడు అప్పట్టుకు ఎంపయసి \(x = \) 

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

Question Number : 72  Question Id : 1874634712  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(\int \frac{\cos 4x + 1}{\cot x - \tan x} \, dx = k \cos 4x + c\), then \(k\) is

\(\int \frac{\cos 4x + 1}{\cot x - \tan x} \, dx = k \cos 4x + c\) కి, భాగం క హింది

Options:
1. \(-\frac{1}{2}\) 
2. \(-\frac{1}{4}\) 
3. \(-\frac{1}{8}\)
Question Number : 73  Question Id : 1874634713  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int e^{2x} \left[ \cos (3x + 4) + 5x^2 \right] dx = \]

Options :

1. \[ e^{2x} \left[ \frac{2}{13} \cos (3x + 4) + \frac{3}{13} \sin (3x + 4) + \frac{5x^2}{2} - \frac{5x}{2} + \frac{5}{4} \right] + c \]

2. \[ e^{2x} \left[ \frac{2}{13} \cos (3x + 4) - \frac{3}{13} \sin (3x + 4) + \frac{5x^2}{2} + \frac{5x}{2} + \frac{5}{4} \right] + c \]

3. \[ e^{2x} \left[ \frac{2}{13} \cos (3x + 4) - \frac{3}{13} \sin (3x + 4) - \frac{5x^2}{2} - \frac{5x}{2} - \frac{5}{4} \right] + c \]

4. \[ e^{2x} \left[ \frac{2}{13} \cos (3x + 4) - \frac{3}{13} \sin (3x + 4) + \frac{5x^2}{2} - \frac{5x}{2} + \frac{5}{4} \right] + c \]

Question Number : 74  Question Id : 1874634714  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \[ \int \frac{5 \cot x + 1}{(\cot x - 1)(\cot x - 2) \sin^2 x} dx = 6 \log |f(x)| + 11 \log |g(x)| + c \], then \( (f(x), g(x)) = \)

\[ \int \frac{5 \cot x + 1}{(\cot x - 1)(\cot x - 2) \sin^2 x} dx = 6 \log |f(x)| + 11 \log |g(x)| + c \]

Options :

1. \( (\cot x - 1, (\cot x - 2)^{-1}) \)

2. \( ((\cot x - 1)^{-1}, \cot x - 2) \)
\[
\left( (\cot x - 1)^{-1}, (\cot x - 2)^{-1} \right)
\]

\[
(\cot x - 1, \cot x + 2)
\]

Question Number : 75  Question Id : 1874634715  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( I_{m,n} = \int e^{mx} \cdot x^n \, dx \), then \( I_{m,n} + \frac{n}{m} I_{m,n-1} = \)

\[
I_{m,n} = \int e^{mx} \cdot x^n \, dx \quad \text{and} \quad I_{m,n} + \frac{n}{m} I_{m,n-1} =
\]

Options :

1. \( x^n \cdot e^{mx} + c \)
2. \( \frac{x^n e^{mx}}{n} + c \)
3. \( \frac{x^n \cdot e^{mx}}{m} + c \)
4. \( \frac{-x^n \cdot e^{mx}}{m} + c \)

Question Number : 76  Question Id : 1874634716  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\lim_{n \to \infty} \frac{1}{n} \left[ (n+1)(n+2)\ldots(2n) \right] = \frac{1}{n}
\]

Options :

1. 1
2. 0
\[ \int_{0}^{\frac{\pi}{2}} \frac{\sin^2 x}{\sin x + \cos x} \, dx = \]

Options:
1. \[ \frac{3}{\sqrt{2}} \log \left( \sqrt{2} + 1 \right)^{\frac{1}{2}} \]
2. \[ \frac{1}{\sqrt{2}} \log \left( \sqrt{2} + 1 \right) \]
3. \[ \frac{\sqrt{2}}{3} \log \left( \sqrt{3} + 1 \right) \]
4. \[ \frac{2}{\sqrt{3}} \log \left( \sqrt{2} - 1 \right) \]

---

Question Number : 78  Question Id : 1874634718  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The area (in sq.units) enclosed by the loop of the curve \( ay^2 = x^2 (a-x) \), \( a > 0 \) is

\[ \text{(in sq.units)} \]

Options:
1. \[ 2\pi a^2 \]
2. \[ \frac{\pi}{3} a^2 \]
The differential equation corresponding to the family of curves \( y = e^x (A \cos x + B \sin x) \) is 

\[
y = e^x (A \cos x + B \sin x)
\]

Options:
1. \( y'' + y' + y = 0 \)
2. \( y'' + 2y' + 2y = 0 \)
3. \( y'' - 2y' + 2y = 0 \)
4. \( y'' - 2y' - 2y = 0 \)

The solution of the differential equation \( x \frac{dy}{dx} = y - x \tan \left( \frac{y}{x} \right) \) is 

(Here \( k \) is an arbitrary constant)

\[
x \frac{dy}{dx} = y - x \tan \left( \frac{y}{x} \right)
\]

Options:
1. \( x = y \sin^{-1} \left( \frac{k}{x} \right) \)
\[ y = x \sin^{-1} \left( \frac{k}{x} \right) \]

2.

\[ x \sin y + k = 0 \]

3.

\[ y = x \cos(kx) \]

4.

**Physics**

Display Number Panel: Yes
Group All Questions: No

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Question Number: 81  Question Id: 1874634721  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

**Assertion (A):** The number 0.00764 has three significant figures.

**Reason (R):** If the number is less than 1, the zeros on the right of the decimal point but to the left of the first non-zero digit are not significant.

**Options:**

1. Both (A) and (R) are true and (R) is the correct explanation of (A) (A), (R) అంటే ప్రతిపాదం లేదా సాధారణ (R), (A) అనేక విభాగం

2. Both (A) and (R) are true but (R) is not the correct explanation of (A) (A), (R) అంటే ప్రతిపాదం లేదా సాధారణ (R), (A) అనేక విభాగం

3. (A) is true but (R) is false (A) ప్రతిపాదం లేదా, (R) అంటే ప్రతిపాదం లేదా సాధారణ
(A) is false but (R) is true

4.

Question Number : 82  Question Id : 1874634722  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical

A car moving with a velocity 6.25 ms\(^{-1}\) is decelerated with \(2.5\sqrt{v}\) ms\(^{-2}\) (‘v’ is instantaneous velocity). Time taken by the car to come to rest is

\[
6.25\text{ ms}^{-1} \text{ రోకుతో వేగం వచ్చినప్పటికీ } 2.5\sqrt{v}\text{ ms}^{-2} \text{ కానంతో, రెంటకు ఉభానాన్ని}

సిద్ధించనం చేసినప్పటికీ (అంటే ‘v’ సమాధానం సిద్ధించింది)

Options :
1. 2 s
2. 3 s
3. 2.5 s
4. 4 s

Question Number : 83  Question Id : 1874634723  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical

A bullet fired from a gun falls at a distance half of its maximum range. The angle of projection of the bullet is

అంటే గూడితో వోడి పంచించిన కానం రెంటకు మధ్య ఎక్కడ మచ్చి యొక్క బొమ్మలం కూడా రాయాడానికి. అంటే

కానం పంచించింది శేషం

Options :
1. 45°
2. 60°
3. 30°
A body is projected at an angle of 45° from a point on the ground at a distance of 30 m from the foot of a vertical pole of height 20 m. The body just crosses the top of the pole and strikes the ground at a distance \( s \) from the foot of the pole on the other side of the pole. Then \( s = \)

\[
20 \text{ m}
\]

Options:
1. 20 m
2. 30 m
3. 50 m
4. 60 m

An explosion blows a stationary rock into three parts. Two parts of masses 1 kg and 2 kg move at right angles to one another with velocities 12 ms\(^{-1}\) and 8 ms\(^{-1}\) respectively. If the velocity of third part is 4 ms\(^{-1}\), the mass of the rock is

Options:
1. 8 kg
Four blocks A, B, C and D of masses 6 kg, 3 kg, 6 kg and 1 kg respectively are connected by light strings passing over frictionless pulleys as shown in the figure. The strings P and Q are horizontal. The coefficient of friction between the horizontal surface and the block B is 0.2 and the blocks A and B move together. If the system is released from rest then the tension in the string Q is

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

Options:

1. 48 N
A constant power of 7 watt is applied on a toy car of mass 15 kg. The distance travelled by the car when its velocity increases from 3 ms$^{-1}$ to 5 ms$^{-1}$ is

15 kg షెడ్డర అట్టే వధన యొక్క 7 watt వున్న తండ్రి పల్లెటి. త్రవు ఇద్దరి 3 ms$^{-1}$ మరియు 5 ms$^{-1}$ లో విస్తృతి చేసే దూర ఎంతా ఉండదు?

Options:
1. 56 m
2. 7 m
3. 61 m
4. 70 m
A body A moving with momentum ‘P’ collides one dimensionally with another stationary body B of same mass. During impact, A gives impulse ‘J’ to B. Then which of the following is/are correct?

a) The total momentum of A and B is ‘P’ before and after impact and (P - J) during the impact.

b) During the impact, B gives impulse of magnitude J to A.

c) The coefficient of restitution is \[ \left( \frac{2J}{P} - 1 \right) \]

d) The coefficient of restitution is \[ \left( \frac{2J}{P} + 1 \right) \]

A విడి హెచ్ మారయే ‘P’ ఉద్భవించే విద్య తరి సంఖ్య తో పోగుతుంది. కాని B మారయే జీవలు మారయింది వాటి సంఖ్య తరి జీవలు. కీర్తితో కార్యక్రమం A మారయే B మారయింది ‘J’
రీతిగా మారయింది. తాడి రోగ సాధించే సాధనలు లేదా ప్రతిపాదించండి?

a) అది ప్రతి కార్యక్రమం, కానీ A, B యొక్క బలం మారయే ‘P’ రెండవ విద్య తరి జీవలు మారయింది జీవలు ఉగరించిన (P - J)

b) అది ప్రతి కార్యక్రమం B మారయే A మారయింది J రెండవ విద్య తరి జీవలు మారయింది.

c) కూడా జీవలు కార్యక్రమం \[ \left( \frac{2J}{P} - 1 \right) \]

d) కూడా జీవలు కార్యక్రమం \[ \left( \frac{2J}{P} + 1 \right) \]

Options :

only a is correct

a) మాత్రం సాధన

a and c are correct

b) మాత్రం సాధన

b and c are correct

only c is correct

4.
In the figure shown, the blocks have equal masses. Friction, mass of the string and the mass of the pulley are negligible. The magnitude of the acceleration of the centre of mass of the two blocks is (g - acceleration due to gravity)

\[ \left( \frac{\sqrt{3} - 1}{\sqrt{2}} \right) g \]

Options:

1. \[ \left( \frac{\sqrt{3} - 1}{\sqrt{2}} \right) g \]
2. \[ \frac{g}{2} \]
3. \[ (\sqrt{3} - 1) g \]
4. \[ \left( \frac{\sqrt{3} - 1}{4\sqrt{2}} \right) g \]
A wheel of radius 8 cm is attached to a support so as to rotate about a horizontal axis through its centre. A string of negligible mass wrapped around its circumference carries a mass of 0.4 kg attached to its free end. When the mass is released, it descends through 1 m in 10 seconds, then its moment of inertia is

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

8 cm ద్రవ్యం ఉంటుంది మాత్రం కదిలేందుకు, సమానంగా ద్రవ్యం పైన చెందిన కార్యం చేస్తూ విద్యుత్తు అవసరం ఉంది. పండ్లి నిధి నుండి మాత్రం పండ్లి నిధి నుండి కంటే నిధి నుండి, దీని మొత్తం రేటు 0.4 kg పైన పైనందిన నిధి నుండి. పైన నిధి నుండి నిధి నుండి రేటు 10 సహస్రాంతుల మధ్య ద్రవ్యం పైన పైనందిన నిధి నుండి. అమలు చేయి వారి పైన

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

Options:

1. 1.277 kg m$^2$
2. 2.177 kg m$^2$
3. 21.77 kg m$^2$
4. 12.77 kg m$^2$
A body of mass 1 kg is suspended from a spring of negligible mass. Another body of mass 500 g moving vertically upwards hits the suspended body with a velocity of 3 m s\(^{-1}\) and gets embedded in it. If the frequency of oscillation of the system of the two bodies after collision is \(\frac{10}{\pi}\) Hz, the amplitude of motion and the spring constant are respectively

Options:

1. 5 cm, 300 N m\(^{-1}\)

2. 10 cm, 300 N m\(^{-1}\)

3. 10 cm, 600 N m\(^{-1}\)

4. 5 cm, 600 N m\(^{-1}\)

The gravitational field in a region is given by \(\vec{E} = (5\hat{i} + 12\hat{j})\) N kg\(^{-1}\). If a particle of mass 2 kg is moved from the origin to the point (12 m, 15 m) in this region, the change in gravitational potential energy is

Options:

1. –450 J
A uniform wire of length 10 m and diameter 0.6 mm is stretched by 6 mm with certain force. If the Poisson’s ratio of the material of the wire is 0.3, then the change in diameter of the wire is

Options:
1. \(108 \times 10^{-8} \text{ m}\)
2. \(108 \times 10^{-6} \text{ m}\)
3. \(10.8 \times 10^{-8} \text{ m}\)
4. \(1.08 \times 10^{-8} \text{ m}\)
Two tubes of same length and diameters 4 mm and 8 mm are joined together to form a U-shaped tube open at both the ends. If the U-tube contains water, then the difference between the levels of water in the two limbs of the tube is 
(Surface Tension of water at the temperature of experiment is $7.3 \times 10^{-2}$ Nm$^{-1}$, angle of contact = $0^\circ$, density of water = $1.0 \times 10^3$ kg m$^{-3}$ and acceleration due to gravity = $10$ ms$^{-2}$)

4 mm మిచ్చిన 8 mm మిచ్చిన పులుల దీశాన్ని ఒకటే చేత వంటింపబడిన బయట లాడి చేసేవారు. U - బయట పులు వెలుగు కాదున్నది. U - బయట పులు వెలుగు కాదున్నది, పులు వెలుగు కాదున్నది వద్ద హంషి మాంచడు చేసిన బయట (స్త్రీలకు కాపిసే దీశాలు వెలుగు కాదున్న 7.3 $\times$ $10^{-2}$ Nm$^{-1}$, కానుకు సంప్రదాయం = $0^\circ$, వెలుగు పొలిత్తు = $1.0 \times 10^3$ kg m$^{-3}$ వెలుగు పొలిత్తు = $10$ ms$^{-2}$)

Options :
1. 3.65 mm
2. 36.5 mm
3. 0.365 mm
4. 365 mm

A uniform metal bar of length 10 m with a crack at its midpoint is clamped between two rigid supports. The bar buckles upward due to a temperature rise of 40 $^\circ$C. If the coefficient of linear expansion of the metal is $25 \times 10^{-6}$ $^\circ$C$^{-1}$, the maximum displacement of the mid point of the bar is 

ప్రత్యేక గ్రామం యొక్క దీశాలు 10 m ప్రత్యేకం కాదున్నది మరియు విద్యాభ్యాసం వంటింపబడిన బయట కట్టిన బయట నుండి వెలుగు కాదున్నది. వంటింపబడిన బయట నుండి వెలుగు కాదున్నది. ప్రత్యేక గ్రామం యొక్క దీశాలు వెలుగు కాదున్నది. 25 $\times$ $10^{-6}$ $^\circ$C$^{-1}$ వంటింపబడిన బయట కట్టిన బయట నుండి వెలుగు కాదున్నది.

Options :
1. 11.3 cm
Three rods each of length \( l \) and cross sectional area \( 'A' \) are joined in series between two heat reservoirs as shown in the figure. Their conductivities are \( 2K \), \( K \) and \( \frac{K}{2} \) respectively. Assuming that the conductors are insulated from surroundings, the temperatures \( T_1 \) and \( T_2 \) of the junctions in steady state condition are respectively.

\[
\begin{align*}
T_A & \quad 100 \degree C \\
\quad & \quad 2K \quad K \quad \frac{K}{2} \\
\quad & \quad l \quad l \quad l \\
T_B & \quad 0 \degree C
\end{align*}
\]

Options:

1. \[ \frac{600}{7} \degree C, \frac{400}{7} \degree C \]
2. \[ \frac{600}{7} \degree C, \frac{700}{4} \degree C \]
Two heat engines X and Y of same efficiency are connected in series in such a way that the sink of X works as source of Y. X receives heat at 900 K and rejects some heat to its sink at T K and in turn Y rejects heat to its sink at 400 K, then the temperature T is

Options:
1. 550 K
2. 600 K
3. 650 K
4. 700 K

The specific heat capacities of an ideal gas at constant pressure and at constant volume are 620 Jkg\(^{-1}\)K\(^{-1}\) and 420 Jkg\(^{-1}\)K\(^{-1}\) respectively. The density of the gas at STP is approximately

Options:
1. 2.88 kg m\(^{-3}\)
Three closed vessels A, B and C are at the same temperature ‘T’ and contain gases. Vessel A contains only O₂, B contains only N₂ and C contains a mixture of equal quantities of O₂ and N₂. If the rms speed of O₂ molecules in vessel ‘A’ is v₁ and that of N₂ molecules in vessel ‘B’ is v₂ then the rms speed of O₂ molecules in vessel ‘C’ is

\[ \sqrt{\frac{v_1^2 + v_2^2}{2}} \]

Options:
1. \( v_1 \)
2. \( v_2 \)
3. \( (v_1v_2)^{\frac{1}{2}} \)
4. \( \frac{v_1}{2} \)
Match the following List - I with List - II

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Transverse wave</td>
<td>I) Vibrations parallel to the direction of propagation</td>
</tr>
<tr>
<td>B) Longitudinal wave</td>
<td>II) Vibrations perpendicular to the direction of propagation</td>
</tr>
<tr>
<td>C) Beats</td>
<td>III) Superposition of waves travelling in opposite directions</td>
</tr>
<tr>
<td>D) Stationary waves</td>
<td>IV) Superposition of waves travelling in same direction</td>
</tr>
</tbody>
</table>

సాధనాలు సంబంధిత శాతి - I కొన్ని . శాతి - II కొన్ని సంబంధితి.  

<table>
<thead>
<tr>
<th>శాతి - I</th>
<th>శాతి - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) చాతుర్య సంబంధిత</td>
<td>I) శాతిలో శాతిలో మాత్రమే సంబంధితం కావచ్చు</td>
</tr>
<tr>
<td>B) ఎత్తు సంబంధిత</td>
<td>II) శాతిలో శాతిలో మాత్రమే సంబంధితం కావచ్చు</td>
</tr>
<tr>
<td>C) వాయుగొల్లం</td>
<td>III) శాతిలో శాతిలో మాత్రమే సంబంధితం కావచ్చు</td>
</tr>
<tr>
<td>D) కట్టడ సంబంధిత</td>
<td>IV) శాతిలో శాతిలో మాత్రమే సంబంధితం కావచ్చు</td>
</tr>
</tbody>
</table>

The correct answer is

ప్రపంచానికి ప్రయోగాలు

Options:

1. A  B  C  D  
   II  I  III  IV
2. A  B  C  D  
   II  I  IV  III
3. A  B  C  D  
   III  IV  I  II
4. A  B  C  D  
   IV  I  II  III
A police car moving at 22 ms\(^{-1}\) chases a motor cyclist. The police man sounds horn at 176 Hz, while both of them move towards a stationary siren of frequency 165 Hz. If the number of beats heard by the motor cyclist per second is zero, then the speed of motorcycle is 

(speed of sound in air = 330 ms\(^{-1}\))

\[
\text{Options:}
\]

1. 33 ms\(^{-1}\)
2. 22 ms\(^{-1}\)
3. 44 ms\(^{-1}\)
4. 11 ms\(^{-1}\)

When an object is moved along the principal axis of a concave mirror placed in air, the image coincides with the object if the object is 50 cm from the mirror. If the mirror is placed at a depth of 20 cm in a transparent medium, the image coincides with the object when the object is 40 cm from the mirror. The refractive index of the liquid is

\[
\text{Options:}
\]
In Young’s double slit experiment, light of wavelength 5900 Å is used. When the slits are 2 mm apart, the fringe width is 1.2 mm. If the slit separation is increased to one and half times the previous value, then the fringe width will be

Options:

1. 0.9 mm
2. 0.8 mm
3. 1.8 mm
4. 1.6 mm
Two particles with charges + 3.72 μC and + 1.86 μC are some distance apart. If 20% of charge is transferred from first particle to second particle then electrostatic force between them is

+3.72 μC రాశి + 1.86 μC రాశి + 20% రద్దు లభించింది శతాబ్ది రెండు రాశుల వచ్చారు. రాశివిభజను సమీప రాశిత్వం నిశ్చిత రేఖల శతాబ్ది ఉపయోగించండి. 20% రద్దు చేసుకోవడం కార్యం లేదు.

Options:
1. decreases by 12%
2. 12% రద్దు
3. increases by 4%
4. 4% రద్దు
5. decreases by 4%
6. 4% రద్దు

ABC is a right angled triangle in which AB = 3 cm, BC = 4 cm and right angle is at B. Three charges +15 μC, +12 μC and −20 μC are placed respectively at A, B and C. The force acting on charge at B is

ABC యొక్క AB = 3 cm, BC = 4 cm తో అంతర్భాగానికి B కోటు సమీపకి అరితే సమీప నిశ్చిత రేఖల శతాబ్ది. +15 μC, +12 μC రాశిత్వం −20 μC రాశిత్వం A, B యొక్క సమీప కోటు తో అరితే బాగా బప్పించారు.

Options:
1. 1250 N
2. 3500 N
A spherical capacitor has outer sphere of radius 5 cm and inner sphere of radius 2 cm. When the inner sphere is earthed, its capacity is $C_1$ and when the outer sphere is earthed its capacity is $C_2$. Then $\frac{C_1}{C_2}$ is

\[ \text{Options:} \quad \frac{5}{2}, \quad \frac{2}{5}, \quad \frac{7}{3}, \quad \frac{3}{7} \]
The charge on 4 µF capacitor, in the given circuit is

\[ \text{Charge} = \frac{\text{Voltage} \times \text{Capacity}}{\text{Total Resistance}} \]

Options:
1. 24 µC
2. 100 µC
3. 2.4 µC
4. 30 µC
In a meter bridge if the left and right gaps are connected with 2 Ω and 3 Ω resistances respectively then the bridge is balanced. The resistance to be connected with 3 Ω resistance to get the balancing point at midpoint of the bridge wire is

Options:
Magnetic field at the centre of a circular loop of area ‘A’ is ‘B’. Then the magnetic moment of the loop is

\( B A^2 / \mu_0 \pi \)

1.

\( B A / \mu_0 \)

2.

\( B A / \mu_0 \pi \)

3.
A circular coil of radius $10 \text{ cm}$ with $100$ turns carrying a current of $0.5 \text{ A}$ lies in a magnetic field of $2 \text{ T}$ such that the normal drawn to the plane of the coil makes an angle $\theta$ with the direction of the field. Work done in rotating the coil to change the angle $\theta$ from $0^\circ$ to $180^\circ$ is

$\frac{2BA}{\mu_0\sqrt{\pi}}$

Options:
1. $\pi J$
2. $2\pi J$
3. $4\pi J$
4. $8\pi J$
The resultant magnetic moment of three magnetic dipoles, each of magnetic moment ‘M’ shown in the arrangement is

<table>
<thead>
<tr>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $\sqrt{2} \ M$</td>
</tr>
<tr>
<td>2. $(\sqrt{2} + 1) \ M$</td>
</tr>
<tr>
<td>3. $(\sqrt{2} - 1) \ M$</td>
</tr>
<tr>
<td>4. $M$</td>
</tr>
</tbody>
</table>

Question Number : 113  Question Id : 1874634753  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A long solenoid with 2000 turns per metre has a small loop of radius 3 cm placed inside the solenoid normal to its axis. If the current through the solenoid increases steadily from 1.5 A to 5.5 A in \( \frac{\pi^2}{100} \) s, the induced emf in the loop is

\[ \text{Options:} \]

1. 0.144 mV
2. 0.288 mV
3. 0.072 mV
4. 0.316 mV

---

In the given circuit, the angular frequency of the voltage source is \( 70 \times 10^3 \) rad s\(^{-1} \). The circuit effectively behaves like

\[ \text{Diagram with AC source, 100 \mu H, 1 \mu F, 10 \Omega} \]
A parallel plate capacitor consists of two circular plates each of radius 2 cm, separated by a distance of 0.1 mm. If the potential difference across the plates is varying at the rate of $5 \times 10^6 \text{ Vs}^{-1}$, then the value of displacement current is

Options:

1. 5.56 A
2. 5.56 mA
3. 0.556 mA
4. 2.28 mA
Light of wavelength 488 nm produced by an Argon laser is used in the photoelectric effect. When light from this spectral line is incident on the cathode, the stopping potential of photoelectrons is 0.38 V. The work function of the cathode material is

Options:
1. 2.16 eV
2. 216 eV
3. 21.6 eV
4. 0.216 eV

If the first excitation potential of a hypothetical hydrogen-like atom is 15 V, then the third excitation potential of the atom is

Options:
1. 13.6 V
2. \(\frac{4}{75}\) V
3. \(\frac{15}{16}\) V
4. \(\frac{75}{4}\) V
The energy released when one nucleus of $^{235}_{92}U$ undergoes fission is 188 MeV. The energy released when 100 g of $^{235}_{92}U$ undergoes fission is

Options:
1. $3.55 \times 10^{12}$ J
2. $7.71 \times 10^{12}$ J
3. $3.55 \times 10^{13}$ J
4. $7.71 \times 10^{13}$ J

The values of $Y_1$ and $Y_2$ respectively in the following logic circuit if both A and B are 1 are

Options:
1. 1, 1
2. 1, 0
If $E_c$ and $E_m$ are peak values of carrier and modulating signals respectively then for 100% modulation

$\text{దండి పరమాణు మాధ్యమిక శికారి సంఖ్య సందర్శను కలిపి కరగి అందించండి ఎంటకు ఎంటకు E_c మాధ్యమిక E_m ప్రతి 100% పరమాణు శికారి సంఖ్య ప్రతి}$

Options:

1. $E_c = \frac{E_m}{2}$

2. $\frac{E_c^2}{2} = E_m^2$

3. $E_c = E_m$

4. $E_c = 2E_m$

---

Chemistry

Display Number Panel: Yes
Group All Questions: No
The work function \((W_0)\) of Li, K, Mg, Ag and Cu are 2.42, 2.25, 3.70, 4.30 and 4.80 eV respectively. The number of metals which undergo photoelectric effect if a radiation of wavelength 540 nm falls on them is 
\[ 1 \text{ eV} = 1.602 \times 10^{-19} \text{J} \]

Li, K, Mg, Ag, Cu లు ఉన్నది పోషకరేఖ ప్రత్యేకత కొలువు (\(W_0\)) రేఖలో 2.42, 2.25, 3.70, 4.30 మరియు 4.80 eV. 540 nm ఉన్నతంగా అయితే ఎందుకు వైనియోగం కొలువు వహించ లేదు అంటే ఎందుకు వహించదు?
\[ 1 \text{ eV}=1.602\times10^{-19} \text{J} \]

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

What is the mass of a particle with a wavelength of 3.313 Å moving with a speed of \(2.0 \times 10^8 \text{ m/s}\)?

\[ 2.0 \times 10^8 \text{ m/s} \] లోపల జాబితా 3.313 Å రేఖ సాధనం కొలువు వహించిన వైనియోగం విభాగం ఎందుకు వహించిన వైనియోగం?

Options :
1. \(1.0 \times 10^{-28} \text{ kg}\)
2. \(2.0 \times 10^{-32} \text{ kg}\)
3. \(1.0 \times 10^{-32} \text{ kg}\)
4. \(2.0 \times 10^{-28} \text{ kg}\)
If the electronic configuration of M^{3+} is [Xe] 4f^3, then M^{3+} is

\[ \text{M}^{3+} \text{ నిష్పత్తి వంటి విషయం [Xe] 4f^3 తెలియాలే మ}^{3+} \\text{నీని?} \]

Options:
1. Nd^{3+}
2. Pr^{3+}
3. Sm^{3+}
4. Dy^{3+}

The statements which are not correct are:

The statements which are not correct are:

Options:
1. i, ii only
2. i, iii only
3. i, ii, iii

4. ii, iii only

Question Number : 125  Question Id : 1874634765  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Observe the following molecules
C₂N₂O₂F₂

Which one of the following statements is correct for the above molecules?

Options :
1. They exhibit same magnetic property

2. They have same number of bonding molecular orbitals and same number of antibonding molecular orbitals

3. The sequence of molecular orbitals is as follows

$$\sigma_{2p_z} < \left( \pi_{2p_x} = \pi_{2p_y} \right) < \left( \pi_{2p_x}^* = \pi_{2p_y}^* \right) < \sigma_{2p_z}^*$$

4. They have same bond order

Question Number : 126  Question Id : 1874634766  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The ratio of rates of diffusion of gases A and B is 1 : 0.707. If the molecular weight of B is 32, the molecular weight of A is

A, B ప్రత్యేక రెగిల్ వైపు మేలు 1 : 0.707. B మొత్తం అంశార్ధం 32, A అంశార్ధం

Options:
1. 2
2. 64
3. 16
4. 8

Which of the following are non-metal displacement reactions?

ఓంది విభాగాలు ఎంచు కీలక రాశుంది వాని? (s = సిలెస్యా, l = లియా, g = జా, aq = అయ్య)

(A) \( \text{Ca}_\text{s} + 2\text{H}_2\text{O}_\text{l} \rightarrow \text{Ca(OH)}_2\text{aq} + \text{H}_2\text{g} \)

(B) \( \text{V}_2\text{O}_5\text{s} + 5\text{Ca}_\text{s} \xrightarrow{\Delta} 2\text{V}_\text{s} + 5\text{CaO}_\text{s} \)

(C) \( 2\text{Fe}_\text{s} + 3\text{H}_2\text{O}_\text{l} \xrightarrow{\Delta} \text{Fe}_2\text{O}_3\text{s} + 3\text{H}_2\text{g} \)

(D) \( \text{Cr}_2\text{O}_3\text{s} + 2\text{Al}_\text{s} \xrightarrow{\Delta} \text{Al}_2\text{O}_3\text{s} + 2\text{Cr}_\text{s} \)

Options:
1. A, B, C, D
2. B, C only
3. C, D only
4. A, C only
Match the following.

List - I
A) \( \Delta U = W_{\text{ad}} \)
B) \( \Delta U = q - W \)
C) \( \Delta U = -q \)
D) \( \Delta U = 0 \)

List - II
I) Isothermal reversible expansion
II) Wall is adiabatic
III) Thermally conducting walls
IV) Isolated system
V) Closed system

The correct answer is

Options:

A  B  C  D
V I II III
1.
A  B  C  D
I III II IV
2.
A  B  C  D
II V III I
3.
A  B  C  D
II V I III
4.
18.4 g \(\text{N}_2\text{O}_4\) was placed in 1L vessel at 400 K and allowed to attain the following equilibrium:

\[ \text{N}_2\text{O}_4(g) \rightleftharpoons 2\text{NO}_2(g) \]

If the total pressure at equilibrium was 10.64 bar, approximate \(K_p\) is

\(R = 0.083 \text{ L bar K}^{-1}\text{mol}^{-1}\)

(Assume \(\text{N}_2\text{O}_4, \text{NO}_2\) as ideal gases)

400 K లో 18.4 g \(\text{N}_2\text{O}_4\ ను 1L వేలించారు కావచ్చు. ఈ వాస్తవం యొక్క విధానాన్ని యివి లేదు.

\[ \text{N}_2\text{O}_4(g) \rightleftharpoons 2\text{NO}_2(g) \]

పాలనా ద్రవ్యం ను యొక్క సాతాన్ని 10.64 bar వంటి \(K_p\) విలుపు యివి లేదు.

\(R = 0.083\text{ L bar K}^{-1}\text{mol}^{-1}\)

\(\text{N}_2\text{O}_4, \text{NO}_2\ యొక్క పెద్దప్పించబడిన విధానాన్ని యివి లేదు\)

Options:
1. 57.20
2. 24.24
3. 14.30
4. 6.64

If the pH of a buffer solution containing 0.1 M of monoacidic base and 0.01 M of its salt is 10.5, the pKa of conjugate acid is

\[ \text{0.1 M యొక్క రవాణా సలాములు, 0.01 M యొక్క రవాణా సలాము కలుపించబడిన పh 10.5 వంటి పాచి యొక్క పెద్ద పెక్కా విధానాన్ని యివి లేదు} \]

Options:
1. 9.5
2. 4.5
Question Number : 131 Question Id : 1874634771 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Three vessels (A, B, C) contain H₂O₂ solution. In vessel A, 500 mL of 10 vol H₂O₂ is present. 100 mL of 30 vol H₂O₂ is present in vessel B. Vessel C is filled with 250 mL of 2M H₂O₂. The weight (in g) of H₂O₂ present in these vessels follows the order

Options :
1. C > A > B
2. C > B > A
3. B > A > C
4. A > B > C

Question Number : 132 Question Id : 1874634772 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Identify correct statements from the following:

i. Beryllium oxide is an amphoteric oxide.
ii. Group II elements dissolve in liquid ammonia to form deep blue-black solutions.
iii. The hydration enthalpy of group II ions decreases from Be²⁺ to Ba²⁺.

Options :

i. బీరెలియం ఒక్సెడ్ అమ్ఫోటరిక్ ఒక్సెడ్
ii. గ్రూప్ II ఎమ్మెల్స్ ఏటాన్ అమ్మాన్లో కలిగి ఉంటాయి
iii. గ్రూప్ II ఐన్ని లోస్స్టీ బిరోంగ్ బిరోంగ్ బ్యారియం మందం బిరోంగ్ మందం
Identify correct statements from the following.

i. \( \text{H}_3\text{BO}_3 \) is a monobasic acid.

ii. The correct formula of borax is \( \text{Na}_2[\text{B}_4\text{O}_5(\text{OH})_3]8\text{H}_2\text{O} \)

iii. \( \text{NaBH}_4 \) is a reducing agent.

Questions:

1. i, ii only

2. ii, iii only

3. i, iii only

4. i, ii, iii

Question Number : 134  Question Id : 1874634774  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Options : 

1. i, ii, iii

2. i, ii only

3. ii, iii only

4. i, iii only
Observe the following statements regarding C₆₀.

i. All carbons are sp² hybridised  
ii. It contains 12 rings of five carbons each and 20 rings of six carbons each  
iii. It is a non-aromatic compound  
iv. It is pure form of carbon  
v. C-C bond lengths in it are 143.5 and 138.3 pm  
vi. It is prepared by heating graphite in an electric arc in the presence of oxygen

C₆₀ కోన్నంలో ప్రత్యేక ప్రత్యేకతలు ఉన్నాయి. 

i. ఎల్లు సరిపులు sp² హిడ్రైడేటులు ఉన్నాయి  
ii. సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం  
iii. ప్రత్యేక ప్రత్యేకత ఉన్నాయి  
iv. ప్రత్యేక ప్రత్యేకత ఉన్నాయి  
v. సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం  
vi. సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం సౌమ్యం 

The correct statements are

అధికంగా యొక్కుడైనవి?

Options:

1. i, ii, iii, iv, v  
2. i, ii, iv, v only  
3. i, ii, iv, vi only  
4. i, ii, iii only
Identify the correct statements from the following:

i. In the presence of UV light, CF₂Cl₂(g) gives chlorine free radicals which will react with O₃(g) to form O₂(g)
ii. Drinking water with 10 ppm fluoride is better than drinking water with 1 ppm fluoride
iii. The maximum permissible concentration of lead in drinking water is 50 ppb

Options:
1. i, ii, iii
2. i, ii only
3. ii, iii only
4. i, iii only

Which of the following conversion represents Fries rearrangement?

Options:
1. O-acylated phenol to C-acylated phenol
2. C-acylated phenol to O-acylated phenol
What are X and Y in the following reaction?

\[ \text{Hex - 2 - ene} \xrightarrow{O_3} \text{Ozonide} \xrightarrow{\text{Zn} + \text{H}_2\text{O}} X + Y \]

What are X and Y?

\[ \text{Zn - 2 - ene} \xrightarrow{O_3} \text{Ozonide} \xrightarrow{\text{Zn} + \text{H}_2\text{O}} X + Y \]

Options:

1. X
   \[ \text{CH}_3\text{CH}_2\text{CHO} \]
   Y
   \[ (\text{H}_3\text{C})_2\text{CO} \]

2. X
   \[ \text{CH}_3\text{CH}_(\text{CH}_3)\text{COOH} \]
   Y
   \[ \text{CH}_3\text{COOH} \]

3. X
   \[ \text{CH}_3\text{CH}_2\text{CH}_2\text{CHO} \]
   Y
   \[ \text{CH}_3\text{CHO} \]

4. X
   \[ \text{CH}_3\text{CH}_(\text{CH}_3)\text{CHO} \]
   Y
   \[ \text{CH}_3\text{CHO} \]
What are X and Y in the following reactions?

What are X and Y in the following reactions? (conc = మధ్య, dilute = విత్తి)

\[
\begin{array}{ccc}
\text{X} & \text{Benzene} & \text{Y} \\
\text{NO}_2 & \text{SO}_3\text{H} & \\
\end{array}
\]

Options:
1. X: Conc.\(\text{HNO}_3\)  Y: \(\text{H}_2\text{SO}_4(\text{SO}_3)\)
2. X: Conc.\(\text{HNO}_3\) + Conc.\(\text{H}_2\text{SO}_4/333\text{K}\)  Y: \(\text{H}_2\text{SO}_4(\text{SO}_3)\)
3. X: \(\text{NaNO}_2/\text{HCl}\)  Y: \(\text{H}_2\text{SO}_4\)
4. X: Dilute \(\text{HNO}_3\)  Y: \(\text{SO}_3\)

Which of the following statements are not correct?

(A) Diode is a combination of n-type and p-type semiconductors
(B) Silicon or germanium is electron rich impurity
(C) Phosphorous and arsenic are electron deficient impurities
(D) Schottky defect decreases the density of the crystal

Which of the following statements are not correct?

(A) నైట్రను, p-న్యాట్రాము ఆస్ట్ర్యాలు సమ౱డా, కావట్లు
(B) సికాలే ఇబ్రామ్యం అంటే కొనియతు మారితే
(C) ప్రాంమిడ్యుర్స్, ఆర్సన్ ఆస్ట్ర్యాలు శిష్త కావట్లు
(D) కావిలో, ప్రాంమిడ్యుర్స్ కొండను మారితే
At 298 K, the vapour pressure of a solution of 7.5 g of non-volatile solute in 90 g of water is 2.8 kPa. If 18 g of water is added to this solution the vapour pressure becomes 2.81 kPa at same temperature, the molar mass of solute in g mol$^{-1}$ is

298 K లో 90 గ్మ వాటికి 7.5 గ్మ బ్రెక్సింగ్ లేదు కాదంటే 2.8 kPa యునెంచగలిగితే 18 గ్మ వేసి రాకాబడించినప్పటికీ 2.81 kPa యునెంచగలిగితే రాకాబడినప్పటి గ్మమిగమ బ్రెక్సింగ్ లేదు

Options:
1. 17.5
2. 68.2
3. 71.5
4. 51.8

At T(K), the vapour pressures of pure liquids A and B are 100 mm and 160 mm respectively. An ideal solution is formed by mixing 2 moles of A and 3 moles of B at the same temperature. The mole fraction of A and B in the vapour state respectively are

T(K) లో A, B లూ 100 మమ్మ 160 మమ్మ యునెంచాలని 2మోలు అంచిన A మరియు 3మోలు బ్రెక్సింగ్ A మరియు B యునెంచుకోవచ్చు

Options:
Question Number : 142  Question Id : 1874634782  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In which of the following cells, the space between cathode and anode is filled by a moist mixture of ammonium chloride and zinc chloride

Options:
1. Mercury cell
2. Leclanche cell
3. Nickel-Cadmium cell
4. Fuel cell
The rate equation for the reaction
\[2A + B \rightarrow \text{products}\]
rate = \(k [A][B]^2\).
If \(k\) at \(T(K)\) is \(5.0 \times 10^{-6} \text{ mol}^{-2} \text{L}^2 \text{s}^{-1}\), the initial rate of the reaction, when \([A] = 0.05 \text{ mol L}^{-1}\)
and \([B] = 0.1 \text{ mol L}^{-1}\) is

\[2A + B \rightarrow \text{products}\]
\(k = \frac{\text{rate}}{[A][B]^2}\).
\(T(K)\) \(k = 5.0 \times 10^{-6} \text{ mol}^{-2} \text{L}^2 \text{s}^{-1}\) \(\Rightarrow\) \([A] = 0.05 \text{ mol L}^{-1}\), \([B] = 0.1 \text{ mol L}^{-1}\)

Options:
1. \(1.25 \times 10^{-9} \text{ L mol L}^{-1} \text{ s}^{-1}\)
2. \(1.25 \times 10^{-9} \text{ mol L}^{-1} \text{ s}^{-1}\)
3. \(2.50 \times 10^{-9} \text{ L mol L}^{-1} \text{ s}^{-1}\)
4. \(2.50 \times 10^{-9} \text{ L mol}^{-1} \text{ s}^{-1}\)

Which one of the following statements is not correct?

Options:
The process of settling down of colloidal particles is coagulation

1.
The mass in milligrams of lyophilic sol which protects the coagulation of 10 mL of a gold sol on adding 1mL of 10% NaCl solution is its gold number

2.

The layer of positive or negative charge acquired by selective adsorption of ion on the surface of a colloidal particle is electrokinetic potential

3.

The potential difference between the fixed layer on the colloidal particles and the diffused layer of opposite charge is zeta potential

4.

Identify the correct statements from the following:
i. In the extraction of Ag and Au, zinc is used as reducing agent.
ii. Impure zinc can be refined by distillation method.
iii. Malachite is an ore of nickel.

Options:
1. i, ii, iii

2. i, iii only

3. ii, iii only
White phosphorous reacts with sulphuryl chloride to form PCl₅ and X. Chlorine reacts with X in the presence of wood charcoal to form Y. X and Y are respectively

Options:
1. SO₂, SO₂Cl₂
2. SO₂, SCl₄
3. SO₃, SO₂Cl₂
4. SO₃, SCl₄

Identify the correct statements from the following:

i. Sulphuric acid is manufactured by contact process.
ii. SO₃ dissolves in H₂SO₄ to form pyrosulphuric acid.
iii. H₂SO₄ is used in the manufacture of fertilizers such as ammonium sulphate and super phosphate.
iv. In the reaction S + 2H₂SO₄(Conc.) \(\rightarrow\) 3SO₂ + 2H₂O, H₂SO₄ is oxidized to SO₂.

Options:
1. i, ii, iii, iv
i, iii, iv only
3.

i, ii, iii only
4.

Question Number : 148  Question Id : 1874634788  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Assertion (A) : Helium has lowest boiling point (4.2 K)
Reason (R) : The forces that exist between Helium atoms are weak dispersion forces.

 Assertion (A) : హెలియం నాలుగు వృత్తాన్ని 4.2 కిలోడానికి సంత‌ల సృష్టి

 Reason (R) : హెలియం నాలుగు వృత్తాన్ని నాలుగు వృత్తాన్ని నాలుగు వృత్తాన్ని నాలుగు వృత్తాన్ని

The correct answer is

Options :

Both (A) and (R) are correct and (R) is the correct explanation of (A).

(A) విస్తృతి (R) అంటారు విస్తృతి (A) అంటారు (R) విస్తృతి రెండివైన

1.

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

(A) విస్తృతి (R) అంటారు విస్తృతి (A) అంటారు (R) విస్తృతి రెండివైన

2.

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

(A) విస్తృతి (R) అంటారు విస్తృతి

3.

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

(A) విస్తృతి (R) అంటారు విస్తృతి

4.

Question Number : 149  Question Id : 1874634789  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which one of the following reactions does not take place?

రెండు వాస్తవాన్ని వేసేద్దున్నది? (s = వాస్తవాన్ని ; aq = వాస్తవాన్ని)

Options :
The stepwise stability constants of a complex are given below. What is its overall reaction stability constant \( \beta_4 \)?

\[
\begin{align*}
M + L &\rightleftharpoons ML; \quad K_1 = 1.0 \times 10^4 \\
ML + L &\rightleftharpoons ML_2; \quad K_2 = 1.0 \times 10^3 \\
ML_2 + L &\rightleftharpoons ML_3; \quad K_3 = 1.0 \times 10^3 \\
ML_3 + L &\rightleftharpoons ML_4; \quad K_4 = 1.0 \times 10^2 \\
\end{align*}
\]

(Overall reaction: \( M + 4L \rightleftharpoons ML_4 \))

Options:

1. \( 1.0 \times 10^{12} \)
2. \( 12.1 \times 10^3 \)
3. \( 1.0 \times 10^6 \)
4. \( 1.0 \times 10^8 \)
Number average molecular mass of a polymer that contains 15 molecules with each of mass 8,000 and 15 molecules with each of mass 80,000 is

Options:
1. 22,000
2. 33,000
3. 11,000
4. 44,000

Which of the following statements are correct?
(A) A tripeptide has two peptide bonds
(B) A pentapeptide contains five amino acids
(C) Nucleotide is a product of base and sugar
(D) In cellulose, β-glycosidic linkages are present

Options:
1. B, C, D
2. C, D only
3. A, B, D
4. A, C only

Question Number: 153  Question Id: 1874634793  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Identify antihistamines from the following

<table>
<thead>
<tr>
<th>Serotonin</th>
<th>Dimetane</th>
<th>Phenelzine</th>
<th>Seldane</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Options:
1. 1, 3 only
2. 1, 3, 4
3. 2, 4 only
4. 1, 2, 3

Question Number: 154  Question Id: 1874634794  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Identify Z in the reaction

\[
\begin{array}{c}
\text{X} \\
\text{Z} \\
\text{R}
\end{array}
\]

\(\text{Anhydrous} = \text{water; dry = \text{dry}}\)

Options:
1. RCOX/Anhydrous AlCl₃
What are X, Y, Z in the following reactions?

\[
\begin{align*}
\text{OH} & \\
\text{CH}_3 - \text{CH} - \text{CH}_3 & \xrightarrow{X} \text{CH}_3 - \text{CH} = \text{CH}_2 + \text{H}_2\text{O} \\
\text{CH}_3 - \text{CH}_2 - \text{OH} & \xrightarrow{Y} \text{CH}_2 = \text{CH}_2 + \text{H}_2\text{O} \\
\text{CH}_3 & \\
\text{CH}_3 - \text{C} - \text{OH} & \xrightarrow{Z} \text{CH}_3 - \text{C} = \text{CH}_2 + \text{H}_2\text{O}
\end{align*}
\]

Options:

1. \[X: \text{H}_2\text{SO}_4, 443\text{K} \quad Y: 85\% \text{H}_3\text{PO}_4, 440\text{K} \quad Z: 20\% \text{H}_3\text{PO}_4, 358\text{K}\]

2. \[X: 85\% \text{H}_3\text{PO}_4, 440\text{K} \quad Y: \text{H}_2\text{SO}_4, 443\text{K} \quad Z: 20\% \text{H}_3\text{PO}_4, 358\text{K}\]

3. \[X: 20\% \text{H}_3\text{PO}_4, 358\text{K} \quad Y: \text{H}_2\text{SO}_4, 443\text{K} \quad Z: 85\% \text{H}_3\text{PO}_4, 440\text{K}\]
What are X, Y and Z in the following reactions?

\[(\text{H}_3\text{C})_3\text{C}-\text{O}+\text{Na}+\text{CH}_3\text{CH}_2\text{Br}\rightarrow \text{X}+\text{NaBr}\]

\[(\text{H}_3\text{C})_3\text{C}-\text{Br}+\text{CH}_3\text{CH}_2\text{ONa}\rightarrow \text{Y}+\text{Z}\]

Options:

1. X: \((\text{H}_3\text{C})_3\text{C}-\text{Br}\)  
   Y: \((\text{H}_3\text{C})_3\text{C}-\text{OH}\)  
   Z: \(\text{CH}_3\text{CH}_2\text{Br}\)

2. X: \(\text{CH}_3-\text{C}=\text{CH}_2\)  
   Y: \((\text{H}_3\text{C})_3\text{C}-\text{OCH}_2\text{CH}_3\)  
   Z: \(\text{NaBr}\)

3. X: \((\text{H}_3\text{C})_3\text{C}-\text{O}-\text{CH}_2\text{CH}_3\)  
   Y: \(\text{CH}_3-\text{C}=\text{CH}_2\)  
   Z: \(\text{CH}_3\text{CH}_2\text{OH}\)

4. X: \(\text{CH}_3-\text{CH}-\text{CH}_2\text{OH}\)  
   Y: \(\text{CH}_3-\text{CH}-\text{OCH}_2\text{CH}_3\)  
   Z: \(\text{NaBr}\)
Structures of cinnamaldehyde (I), salicylaldehyde (II) and vanillin (III) are

1. 

2. 

3. 

4.

Question Number : 158 Question Id : 1874634798 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Which of the following are oxidized by NaOCl?

I. RCH(OH)CH₃  II. RCH₂CH₂-C-CH₂CH₃  III. R-COCH₃  IV. CH₃CHO  V. \[\text{\text{H}}\text{C-C}\text{CH}_3\text{COCH}_3\]

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

Benzaldehyde on heating with concentrated NaOH gives

\[\text{\text{\text{H}}\text{C-C}\text{CH}_3\text{COCH}_3}\]

Options:
1. \[\text{\text{H}}\text{C-CH}_{2}-\text{CO}-\text{CH} \text{\text{H}}\text{C}\text{C}\text{H}3\text{COCH}_3\]
2. \[\text{\text{H}}\text{C}=\text{CH}-\text{CO}-\text{CH} \text{\text{H}}\text{C}\text{C}\text{H}3\text{COCH}_3\]
3. \[\text{\text{H}}\text{C-CH}_{2}\text{OH}, \text{\text{H}}\text{C-COONa}\]
4. \[\text{\text{H}}\text{C-OH}, \text{\text{H}}\text{C-CH}_{2}\text{COONa}\]
The reaction
\[ \text{ArN}_2\text{Cl} + \text{Cu} + \text{HCl} \rightarrow \text{ArCl} + \text{N}_2 + \text{CuCl} \]
is known as

\[ \text{ArN}_2\text{Cl} + \text{Cu} + \text{HCl} \rightarrow \text{ArCl} + \text{N}_2 + \text{CuCl} \]  

Options:

1. Gatterman reaction
2. Sandmeyer reaction
3. Stephen reaction
4. Swarts reaction

\[ \text{స్వార్ట్స్ రాక్షన్} \]
\[ \text{సండ్మీయర్ రాక్షన్} \]
\[ \text{స్పెటియన్ రాక్షన్} \]