If \( f(x) \) is a polynomial function satisfying \( f(x) \cdot f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right) \) and \( f(4) = 257 \), then \( f(3) = \) 

Options:
1. 28
2. 65
3. 82
4. 244

Question Number : 2 Question Id : 4557344322 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
The set of all real values of \( x \) for which the real valued function \( f(x) = \left(1 + \frac{1}{x}\right)^x \) is defined, is

\[ f(x) = \left(1 + \frac{1}{x}\right)^x \]

Options:

1. \( (0, \infty) \)
2. \( \mathbb{R} - \{0\} \)
3. \( (-\infty, -1) \cup (0, \infty) \)
4. \( \mathbb{R} - \{0, -1\} \)

Question Number : 3  Question Id : 4557344323  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let \( S_n = \sum_{k=1}^{n} (-1)^{k-1} \cdot k^2 \) for \( n \geq 1 \). Given that \( S_{2n} = -n(2n+1) \) for \( n = 1, 2, 3, \ldots \), then \( S_{77} = \)

\[ \sum_{k=1}^{n} (-1)^{k-1} \cdot k^2 \]

Options:

1. \(-3003\)
2. \(3003\)
3. \(-2926\)
4. \(2926\)

Question Number : 4  Question Id : 4557344324  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\begin{array}{ccc}
125 & 5 & 25 \\
343 & 7 & 49 \\
729 & 9 & 81 \\
\end{array}
\]

Options:
Let matrix $A = \begin{bmatrix} 5 & -3 & 0 \\ -3 & 5 & 0 \\ 0 & 0 & 2 \end{bmatrix}$, $X$ be a non-zero matrix of order $3 \times 1$ and $c$ be a real number.

If $A^2X = cAX$, then the number of distinct values of $c$ is

$A^2 = \begin{bmatrix} 5 & -3 & 0 \\ -3 & 5 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

Options:

1. 3
2. 2
3. 1
4. 0
A set of values of $\theta$ for which the system of equations
\[(\sin 3\theta) x - y + z = 0,\]
\[(\cos 2\theta) x + 4y + 3z = 0,
2x + 7y + 7z = 0\]
has non-trivial solutions is
\[(\sin 3\theta) x - y + z = 0,\]
\[(\cos 2\theta) x + 4y + 3z = 0,
2x + 7y + 7z = 0\]

Options:
1. \[\frac{(n+1)\pi}{2} + (-1)^n \frac{\pi}{4}\]
   (here $n$ is any integer  枚మం  $n$ ఒక ఎంతోతా అంశం)
2. \[\frac{(n-1)\pi}{2} + (-1)^n \frac{\pi}{3}\]
   (here $n$ is any integer  枚మం  $n$ ఒక ఎంతోతా అంశం)
3. \[\frac{n\pi}{2} + (-1)^n \frac{\pi}{6}\]
   (here $n$ is any integer  枚మం  $n$ ఒక ఎంతోతా అంశం)
4. \[n\pi + (-1)^n \frac{\pi}{6}\]
   (here $n$ is any integer  枚మం  $n$ ఒక ఎంతోతా అంశం)

Question Number : 7  Question Id : 4557344327  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The maximum value of the modulus of $e^z$ on the set \[\{z \in C \mid 0 \leq \Re(z) \leq 1, 0 \leq \Im(z) \leq 1\}\] is

Options:
2. \( e \)
3. \( e + 1 \)
4. \( e^2 \)

Question Number : 8  Question Id : 4557344328  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( Z \neq \pm 1 \) is a complex number and \( \text{Arg} \left( \frac{Z-1}{Z+1} \right) = \frac{\pi}{4} \), then the locus of \( Z \) in the Argand plane is

\[ Z \neq \pm 1 \]  అయితే అయితే జోగులు ప్రశ్నాంశం అయితే \( \text{Arg} \left( \frac{Z-1}{Z+1} \right) = \frac{\pi}{4} \) అయితే \( Z \) అయితే అయితే

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

Question Number : 9  Question Id : 4557344329  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( C_r = \frac{\pi}{4} \), then \( C_0 + C_4 + C_8 + \cdots = \)

\[ C_r = \frac{\pi}{4} \]  అయితే \( C_0 + C_4 + C_8 + \cdots = \)

Options :
1. \[ \frac{2^n}{2} \left[ \frac{n\pi}{4} + \frac{n}{2^{n-1}} \right] \]
Question Number : 10  Question Id : 4557344330  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical

One of the complex roots of the equation \( x^{11} - x^6 - x^5 + 1 = 0 \) is

\[ x^{11} - x^6 - x^5 + 1 = 0 \]

Options :
1. \( \text{cis} \frac{3\pi}{5} \)
2. \( \text{cis} \frac{\pi}{3} \)
3. \( \text{cis} \frac{5\pi}{6} \)
4. \( \text{cis} \frac{7\pi}{5} \)

Question Number : 11  Question Id : 4557344331  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
If the quadratic equation \(4 \sec^2 \alpha \cdot x^2 + 2x + \left( \beta^2 - \beta + \frac{1}{2} \right) = 0\) has real roots, then the value of \(\cos^2 \alpha + \cos^{-1} \beta\) is

\[
4 \sec^2 \alpha \cdot x^2 + 2x + \left( \beta^2 - \beta + \frac{1}{2} \right) = 0
\]

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

The sum of the non-real roots of \((p^2 + p - 3)(p^2 + p - 2) - 12 = 0\) is

\[
(p^2 + p - 3)(p^2 + p - 2) - 12 = 0
\]

Options:
1. 1
2. -1
3. 6
4. -6
The solution set of the inequation \( \sqrt{x^2 + 6x + 5} > (8 - x) \) is

\[
\sqrt{x^2 + 6x + 5} > (8 - x)
\]

Options:
1. \((8, \infty)\)
2. \(\left(\frac{59}{22}, 8\right)\)
3. \(\left(\frac{59}{22}, \infty\right)\)
4. \((-1, \infty)\)

Question Number : 14  Question Id : 4557344334  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(\alpha, \beta\) are the irrational roots of the equation \(x^5 - 5x^4 + 9x^3 - 9x^2 + 5x - 1 = 0\), then the roots of the equation \((\alpha + \beta)x^2 + 2\alpha\beta x - \alpha\beta = 0\) are

\[
(\alpha + \beta)x^2 + 2\alpha\beta x - \alpha\beta = 0
\]

Options:
1. \(-1, \frac{1}{3}\)
2. \(\frac{3 \pm \sqrt{5}}{2}\)
3. \(\frac{1 \pm i\sqrt{3}}{2}\)
4. \(-1, -\frac{1}{3}\)

Question Number : 15  Question Id : 4557344335  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Let \( m \) be a natural number such that \( 20000 < m < 60000 \) and let \( k \) be the sum of all the digits in \( m \). Then the number of numbers \( m \) for which \( k \) is even, is

\[
\text{మీ సంఖ్య} m యొక్క 20000 < m < 60000 అంశాల యొక్క సంఖ్యను కూడా మారి, m లో అతి అనే రెండు

\( \text{కోస్మలు} k \) మరియు బావాని. ఇందుకే \( k \) హెచ్‌హెచ్ అంశాల మారి సమాధానం m యొక్క

Options:
1. 19909
2. 19989
3. 18999
4. 19999

Question Number : 16  Question Id : 4557344336  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical

There are three sections in a Question Paper, each containing 4 Questions. If a candidate has to answer only 5 Questions from this paper without leaving any section, then number of ways the candidate can make the choice of questions is

\[
\text{ఇది ఒక పేపర్ లోని మూడు సహస్రత్వాల అతనికి 4 ప్రశ్నలు ఉన్నాయి. అందులో కొనసాగు పదార్థాలు 5 ప్రశ్నలు మార్గం వాటి సంఖ్య లోనింటిని, అందులో కొనసాగు మేఘాల పదార్థాల ఉండండు మార్గం ఉంటుంది}

Options:
1. 624
2. 704
3. 384
4. 432

Question Number : 17  Question Id : 4557344337  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical

The coefficient of \( x^4 \) in the expansion of \( (1 + x - x^2 - x^3)^{11} \) is

\[
(1 + x - x^2 - x^3)^{11} \text{ కోస్మలు} x^4 \text{ కోస్మలు} \text{ నిర్ధారించండి}

Options:
If $|x|$ is so small that $x^2$ and higher powers of $x$ may be neglected, then the approximate value of \( \frac{\sqrt{4+x} + \sqrt[3]{8-x}}{\left(1 - \frac{2x}{3}\right)^{\frac{1}{2}}} \) when $x = \frac{6}{25}$ is

\[
x = \frac{6}{25} \quad \text{approximates} \quad \frac{\sqrt{4+x} + \sqrt[3]{8-x}}{\left(1 - \frac{2x}{3}\right)^{\frac{1}{2}}}
\]

Options:
1. 6
2. 5
3. \(\frac{2}{3}\)
4. \(\frac{5}{6}\)
The coefficient of \( x^4 \) in the power series expansion of \( \frac{x^2 - 1}{(x^2 + 1)(x^2 + 2)} \) is

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

Options:

1. \( \frac{15}{16} \)
2. \( \frac{15}{4} \)
3. \( \frac{13}{8} \)
4. \( \frac{77}{324} \)

The smallest positive root of the equation \( \tan x - x = 0 \) lies in the interval

\[
\tan x - x = 0
\]

Options:

1. \( \left( 0, \frac{\pi}{2} \right) \)
2. \( \left( \frac{\pi}{2}, \pi \right) \)
3. \( \left( \pi, \frac{3\pi}{2} \right) \)
4. \( \left( \frac{3\pi}{2}, 2\pi \right) \)
Question Number : 21  Question Id : 4557344341  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\left(1 + \cos \frac{\pi}{8}\right)\left(1 + \cos \frac{2\pi}{8}\right)\left(1 + \cos \frac{3\pi}{8}\right)\left(1 + \cos \frac{4\pi}{8}\right)\left(1 + \cos \frac{5\pi}{8}\right)\left(1 + \cos \frac{6\pi}{8}\right)\left(1 + \cos \frac{7\pi}{8}\right) = 
\]

Options :

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

\[\frac{1}{16}\]

\[\frac{1}{32}\]

\[\frac{1}{64}\]

---

Question Number : 22  Question Id : 4557344342  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( A \) is in the third quadrant and \( \tan A = \frac{\sqrt{7}}{3} \), then \( 18 - 16\sin^2 \left(\frac{A}{2}\right) - 32\sin \left(\frac{A}{2}\right)\sin \left(\frac{5A}{2}\right) = \)

\[\tan A = \frac{\sqrt{7}}{3}, \quad 18 - 16\sin^2 \left(\frac{A}{2}\right) - 32\sin \left(\frac{A}{2}\right)\sin \left(\frac{5A}{2}\right) = \]

Options :

\[1. \ -6\]

\[2. \ 11\]

\[3. \ 5\]

\[4. \ 10\]

---

Question Number : 23  Question Id : 4557344343  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

---
Let \( P(\alpha, \beta) \) and \( Q(\gamma, \delta) \) be two points that lie on the curve \( \tan^2(x+y) + \cos^2(x+y) + y^2 + 2y = 0 \) in the XY-plane. If the distance between \( P \) and \( Q \) is \( d \), then \( \cos d = \)

\[
\text{XY-} \quad \tan^2(x+y) + \cos^2(x+y) + y^2 + 2y = 0 \quad \text{P}(\alpha, \beta), \quad \text{Q}(\gamma, \delta) \quad \text{in the XY-plane.} \quad \text{P}, \quad \text{Q} \quad \text{and} \quad \text{d} \quad \text{to} \quad \alpha \quad \text{and} \quad \beta, \quad \cos d =
\]

Options:
1. 0
2. \((-1)^n, n \in \mathbb{N}\)
3. \(\pm \pi\)
4. \(\pm 2n\pi, n \in \mathbb{N}\)

Question Number: 24  Question Id: 4557344344  Question Type: MCQ  Display Question Number: Yes  Single Line Question  Option: No  Option Orientation: Vertical

\[
\tan^{-1}2 + \cot^{-1}(-3) + \cot^{-1}\frac{1}{3} + \tan^{-1}\left(-\frac{1}{2}\right) =
\]

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

Question Number: 25  Question Id: 4557344345  Question Type: MCQ  Display Question Number: Yes  Single Line Question  Option: No  Option Orientation: Vertical

If \( x = -\frac{1}{2} \), \( \sin^{-1}x + \cosec^{-1}x = \)

\[
x = -\frac{1}{2} \quad \sin^{-1}x + \cosec^{-1}x =
\]
\[ \log_e \left( \frac{7 - 3\sqrt{5}}{2} \right) \]

2. \[ \log_e \left( \frac{3 + \sqrt{5}}{2} \right) \]

3. \[ \log_e \left( \frac{(\sqrt{5} - 1)(2 + \sqrt{3})}{2} \right) \]

4. \[ \log_e \left( \frac{(\sqrt{5} + 1)(2 + \sqrt{3})}{2} \right) \]

**Question Number : 26  Question Id : 4557344346  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

\[ \sin \triangle ABC, \text{ if } \frac{s-a}{11} = \frac{s-b}{12} = \frac{s-c}{13} \text{ then } \tan^2 \left( \frac{A}{2} \right) + \tan^2 \left( \frac{C}{2} \right) = \]

\[ \sin \triangle ABC \Rightarrow \frac{s-a}{11} = \frac{s-b}{12} = \frac{s-c}{13} \Rightarrow \tan^2 \left( \frac{A}{2} \right) + \tan^2 \left( \frac{C}{2} \right) = \]

**Options :**

1. \[ \frac{290}{429} \]

2. \[ \frac{290}{143} \]

3. \[ \frac{143}{33} \]

4. \[ \frac{113}{33} \]

**Question Number : 27  Question Id : 4557344347  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**
In $\triangle ABC$, \((a-b)^2 \sin^2 \left(\frac{A+B}{2}\right) + (a+b)^2 \sin^2 \left(\frac{C}{2}\right) = $

$\triangle ABC \leftrightarrow (a-b)^2 \sin^2 \left(\frac{A+B}{2}\right) + (a+b)^2 \sin^2 \left(\frac{C}{2}\right) =$

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

**Question Number : 28  Question Id : 4557344348  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a triangle, if the ex-radii $r_1, r_2, r_3$ are in the ratio 1:2:3, then its sides are in the ratio

Options:
1. 5:8:9
2. 5:4:3
3. 7:9:11
4. 1:2:3

**Question Number : 29  Question Id : 4557344349  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In $\triangle ABC$, if $D$ and $E$ are the mid points of the sides $BC$ and $CA$ respectively, then $2(\overline{AD} + \overline{EB}) =$

$\triangle ABC \leftrightarrow D, E \text{ వంటి భుజులు BC, CAవంటి భుజులు CAను మధ్య విభజిస్తాం, అంకుకు \ 2(\overline{AD} + \overline{EB}) =$

Options:
If \( \vec{n} = 2\vec{i} - 3\vec{j} + 4\vec{k} \), \( \vec{m} = \vec{i} - \vec{j} \), \( \vec{\ell} = 2\vec{i} - \vec{j} + \vec{k} \), then the Cartesian equation of the plane passing through the line of intersection of two planes \( \vec{r} \cdot \vec{n} = 1 \) and \( \vec{r} \cdot \vec{m} = -4 \) and perpendicular to the plane \( \vec{r} \cdot \vec{\ell} = -8 \) is

\[ \vec{r} = \vec{a} + s\vec{i} + t\vec{j} + u\vec{k} \]

\( a, b, c, d \) are vectors of equal magnitude such that \( (\vec{a}, \vec{b}) = \alpha, (\vec{b}, \vec{c}) = \beta, (\vec{c}, \vec{a}) = \gamma \) then the minimum value of \( \cos \alpha + \cos \beta + \cos \gamma \) is

\[ \cos \alpha + \cos \beta + \cos \gamma \]
In \( \Delta ABC \) if \( A(\vec{a}) \), \( B(\vec{b}) \) and \( C(\vec{c}) \) are the position vectors of the vertices, then the length of the perpendicular from \( A \) to \( BC \) is

\[
\Delta ABC \Rightarrow A(\vec{a}), B(\vec{b}) \text{ and } C(\vec{c}) \text{ are the position vectors of the vertices, then the length of the perpendicular from } A \text{ to } BC \text{ is}
\]

Options:

1. \[ |\vec{a} \times \vec{b}| + |\vec{b} \times \vec{c}| + |\vec{c} \times \vec{a}| \]

2. \[ |\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}| \]

3. \[ \frac{|\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}|}{|\vec{a} - \vec{b}|} \]

4. \[ \frac{|\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a}|}{|\vec{c} - \vec{b}|} \]

---

Question Number : 33  Question Id : 4557344353  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \( \vec{a}, \vec{b}, \vec{c} \) are three non-coplanar vectors, then match the items of List-I with those of List-II.

**List - I**

A) \( [\vec{b} \times \vec{c} \quad \vec{c} \times \vec{a} \quad \vec{a} \times \vec{b}] = \)

B) \( [\vec{a} \times \vec{b} \quad \vec{a} \times \vec{c} \quad \vec{b} \times \vec{a}] = \)

C) \( [\vec{a} + \vec{b} + \vec{c} \quad \vec{b} + \vec{c} \quad \vec{c} + \vec{a}] = \)

D) For three mutually perpendicular unit vectors
\( \vec{a}, \vec{b}, \vec{c} : \)
\( [(\vec{a} + \vec{b} + \vec{c}) \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}] = \)

**List - II**

I) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right]^2 \)

II) \( 2 \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \)

III) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \)

IV) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \left[ \vec{a} \cdot \vec{b} \right] \)

V) 0

\( \vec{a}, \vec{b}, \vec{c} \) అంటే మూడు వేర్పొడి సుమారువు వ్యాసులు, వర్ణి-Iలో నిషేధించబడినాం, వర్ణి-IIలో ఎన్నోస్థనికి

**సమాధాన - I**

A) \( [\vec{b} \times \vec{c} \quad \vec{c} \times \vec{a} \quad \vec{a} \times \vec{b}] = \)

B) \( [\vec{a} \times \vec{b} \quad \vec{a} \times \vec{c} \quad \vec{b} \times \vec{a}] = \)

C) \( [\vec{a} + \vec{b} + \vec{c} \quad \vec{b} + \vec{c} \quad \vec{c} + \vec{a}] = \)

D) మూడు వేర్పొడి యొక్క అవసరానే మన్నను నిర్ణయించడానికి
\( \vec{a}, \vec{b}, \vec{c} \) తొమ్మిది:
\( [(\vec{a} + \vec{b} + \vec{c}) \quad \vec{b} \times \vec{c} \quad \vec{c} \times \vec{a}] = \)

**సమాధాన - II**

I) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right]^2 \)

II) \( 2 \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \)

III) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \)

IV) \( \left[ \vec{a} \quad \vec{b} \quad \vec{c} \right] \left[ \vec{a} \cdot \vec{b} \right] \)

V) 0

The correct answer is

**Options:**

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

1. III IV V II
2. IV V II III
Question Number : 34  Question Id : 4557344354  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
\[ \overrightarrow{a}, \overrightarrow{b}, \text{ and } \overrightarrow{c} \text{ are three unit vectors such that no two of them are collinear. If } \overrightarrow{b} = 2(\overrightarrow{a} \times (\overrightarrow{b} \times \overrightarrow{c})) \text{ and } \alpha \text{ is the angle between } \overrightarrow{a}, \overrightarrow{c} \text{ and } \beta \text{ is the angle between } \overrightarrow{a}, \overrightarrow{b} \text{ then } \cos(\alpha + \beta) = \]

\[ \text{Options :} \]
\[ \frac{\sqrt{3}}{2} \]
\[ -\frac{\sqrt{3}}{2} \]
\[ \frac{1}{2} \]
\[ -\frac{1}{2} \]

Question Number : 35  Question Id : 4557344355  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If the variance of 6, 7, 8, 9, 10, 11 is \( \sigma^2 \), then the variance of 112, 114, 116, 118, 120, 122 is

\[ 6, 7, 8, 9, 10, 11 \text{ నిష్టత్వం } \sigma^2 \text{ మాత్రమే, 112, 114, 116, 118, 120, 122 నిష్టత్వం } \]

\[ \text{Options :} \]
\[ 2\sigma^2 \]
3. $4\sigma^2$
4. $100 + 4\sigma^2$

Consider the frequency distribution:

<table>
<thead>
<tr>
<th>C.I.</th>
<th>75-175</th>
<th>175-275</th>
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</tr>
</thead>
<tbody>
<tr>
<td>$f_i$</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

If the variance of this distribution is 60000, then the coefficient of variation of the distribution is

Options:

1. 60
2. $\frac{400\sqrt{6}}{17}$
3. $\frac{400\sqrt{6}}{9}$
4. 595.75

If two numbers $a$ and $b$ are chosen from the set of integers 1 to 39, then the probability that those numbers satisfy the equation $7a - 9b = 0$ is

1. $a$ and $b$ are both divisible by 7 and 9
2. $a$ and $b$ are both divisible by 7 and 9
3. $a$ and $b$ are both divisible by 7 and 9
4. $a$ and $b$ are both divisible by 7 and 9

Q36: Consider the frequency distribution:

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<tr>
<th>C.I.</th>
<th>75-175</th>
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1. 60
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Q37: Consider the frequency distribution:

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2. $a$ and $b$ are both divisible by 7 and 9
3. $a$ and $b$ are both divisible by 7 and 9
4. $a$ and $b$ are both divisible by 7 and 9
Question Number : 38  Question Id : 4557344358  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Two balls are drawn from an urn containing 7 white, 6 red and 8 black balls one after the other without replacement. Then the probability that at least one of them is white, is

Options :

1. $\frac{1}{742}$
2. $\frac{4}{743}$
3. $\frac{4}{741}$
4. $\frac{5}{741}$

Question Number : 39  Question Id : 4557344359  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Options :

1. $\frac{4}{9}$
2. $\frac{13}{30}$
3. $\frac{11}{30}$
4. $\frac{17}{30}$
In a manufacturing company, three machines A, B and C respectively produce 20%, 30% and 50% of the total product. The defective products from A, B and C are respectively 5%, 3% and 2%. If an article produced by the company is selected at random and is found to be defective, then the probability that it is produced by machine B is

\[
\frac{8}{29}
\]

The variance of the random variable \( X \) having the following distribution

\[
\begin{align*}
X = k : & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 \\
P(X = k) : & \quad \frac{1}{6} & \quad \frac{1}{6} & \quad \frac{1}{3} & \quad \frac{1}{6} & \quad \frac{1}{6}
\end{align*}
\]

is

\[
\frac{8}{29}
\]
Given that the probability of a man hitting a target with a gun is $\frac{1}{3}$. If he fires 8 times, then the probability of his hitting the target at least twice is

$\begin{align*}
\text{Options:} \\
1. & \quad \left(\frac{2}{3}\right)^8 \\
2. & \quad 1 - 5\left(\frac{2}{3}\right)^8 \\
3. & \quad \left(\frac{2}{3}\right)^8 \\
4. & \quad \left(\frac{3}{8}\right)^4
\end{align*}$
A variable line ‘L’ passing through the origin cuts two parallel lines \( x - y + 10 = 0 \) and \( x - y + 20 = 0 \) at two points A and B respectively. If P is a point on line ‘L’ such that OA. OP. OB are in harmonic progression, then the locus of P is

Options:
1. \( 3x + 3y + 40 = 0 \)
2. \( 3x + 3y + 20 = 0 \)
3. \( 3x - 3y + 40 = 0 \)
4. \( 3x - 3y + 20 = 0 \)

When the coordinate axes are rotated through an angle of 45° about the origin in the positive direction, if the transformed equation of a curve is \( 17x^2 - 16xy + 17y^2 = 225 \), then the original equation of that curve is

Options:
1. \( 25x^2 + 9y^2 = 225 \)
2. \( 9x^2 - 25y^2 = 225 \)
3. \( 25x^2 - 16xy + 9y^2 = 225 \)
4. \( 9x^2 + 25y^2 = 225 \)
The vertex $A$ of a triangle lies on the lines $x + y = 1$ and $2x + 3y = 6$. If the orthocentre of the triangle is $O\left(\frac{3}{7}, \frac{22}{7}\right)$, then the equation of $OA$ in the normal form is

$$x + y = 1 \quad \text{and} \quad 2x + 3y = 6 \quad \text{determine the orthocentre} \quad A \quad \text{today}. \quad \text{If the orthocentre determines} \quad O\left(\frac{3}{7}, \frac{22}{7}\right) \quad \text{find}, \quad \text{alternate alternative} \quad OA \quad \text{today} \quad \text{today}.$$ 

Options:

1. $x \cos \alpha + y \sin \alpha = 7; \quad \alpha = \tan^{-1} \left(\frac{1}{7}\right)$
2. $x \cos \alpha + y \sin \alpha = \frac{13}{\sqrt{17}}; \quad \alpha = \tan^{-1} \left(\frac{13}{\sqrt{17}}\right)$
3. $x \cos \alpha + y \sin \alpha = \frac{13}{4}; \quad \alpha = \tan^{-1} \left(\frac{13}{4}\right)$
4. $x \cos \alpha + y \sin \alpha = \frac{13}{\sqrt{17}}; \quad \alpha = \tan^{-1} \left(\frac{13}{\sqrt{17}}\right)$

The equation of the line passing through the point of intersection of the lines $2x + 3y + 6 = 0$, $3x - y - 13 = 0$ and parallel to the line $3x - 4y + 5 = 0$ is

$2x + 3y + 6 = 0, \quad 3x - y - 13 = 0 \quad \text{determine the intersection} \quad \text{determine the intersection} \quad \text{determine the intersection} \quad \text{determine the intersection} \quad 3x - 4y + 5 = 0 \quad \text{determine the intersection} \quad \text{determine the intersection} \quad \text{determine the intersection} \quad \text{determine the intersection}.$

Options:

1. $3x - 4y + 75 = 0$
2. $3x - 4y + 15 = 0$
3. $3x - 4y + 25 = 0$
4. $3x - 4y - 25 = 0$
If O, G, S are respectively the orthocentre, centroid and circumcentre of a triangle whose vertices are A(2, 3), B(2, 4) and C(4, 3), then \( AO^2 + 9BG^2 + 4CS^2 = \)

\[ \begin{align*}
A(2, 3), B(2, 4), C(4, 3) \text{ के कोनों } \text{त्रिभुज का } \text{अर्धस्थिति, } \text{स्वतंत्रता, } \\
\text{और } \text{सर्वत्र सम} \text{O, G, S त्रिभुज, } \text{AO}^2 + 9\text{BG}^2 + 4\text{CS}^2 =
\end{align*} \]

Options:
1. \( \frac{77}{36} \)
2. 13
3. \( \frac{8}{9} \)
4. \( \frac{5}{4} \)

If two sides of a triangle are given by \( 3x^2 - 5xy + 2y^2 = 0 \) and its orthocentre is (2, 1), then the equation of the third side of the triangle is

\[ \begin{align*}
3x^2 - 5xy + 2y^2 = 0 \text{ झुकाणे } \text{त्रिभुज के } \text{अर्धस्थिति (2, 1)} \text{ आधार } \\
\text{त्रिभुज के } \text{तीसरी} \text{ भुजा}
\end{align*} \]

Options:
1. \( 5x - 10y + 1 = 0 \)
2. \( 10x + 5y - 1 = 0 \)
3. \( 5x - 10y = 21 \)
4. \( 10x + 5y = 21 \)
The equation of the pair of lines joining the origin to the points of intersection of two circles \(x^2 + y^2 - 4x + 8y + 5 = 0\) and \(x^2 + y^2 + 2x + 4y - 3 = 0\) is:

\[
x^2 + y^2 - 4x + 8y + 5 = 0 \quad \text{and} \quad x^2 + y^2 + 2x + 4y - 3 = 0
\]

Options:

1. \(13x^2 + 6xy - 28y^2 = 0\)
2. \(xy - 28y^2 = 0\)
3. \((x + 4)(x - 5) = 0\)
4. \(13x^2 + 68xy - 28y^2 = 0\)

Question Number: 49 Question Id: 4557344369 Question Type: MCQ Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

If the circle \(x^2 + y^2 + 2gx + 2fy + c = 0\) \((c > 0)\) touches both the coordinate axes and lies in the third quadrant, then the length of the chord intercepted by the circle on the line \(x + y + \sqrt{c} = 0\) is:

\[
x^2 + y^2 + 2gx + 2fy + c = 0\]

Options:

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

Question Number: 50 Question Id: 4557344370 Question Type: MCQ Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical
If the shortest distance from \((2, -14)\) to the circle \(x^2 + y^2 + 6x + 4y - 12 = 0\) is \(d\) and the length of the tangent drawn from the same point to the circle is \(l\), then \(\sqrt{d + l} = \)

\((2, -14)\) నాకు \(x^2 + y^2 + 6x + 4y - 12 = 0\) మూడు వ్యవస్థ మూడు వ్యవస్థ \(d\) మూడు వ్యవస్థ మూడు వ్యవస్థ \(l\) మూడు వ్యవస్థ, \(\sqrt{d + l} = \)

Options:
1. 13
2. \(2\sqrt{5}\)
3. 12
4. 5

Question Number: 51  Question Id: 4557344371  Question Type: MCQ  Display Question Number: Yes Single Line Question Option: No  Option Orientation: Vertical

The number of common tangents to the circles \(x^2 + y^2 - 4x - 2y + k = 0\) and \(x^2 + y^2 - 6x - 4y + l = 0\) having radii 2 and 3 respectively, is

\(x^2 + y^2 - 4x - 2y + k = 0, x^2 + y^2 - 6x - 4y + l = 0\) మూడు వ్యవస్థ మూడు వ్యవస్థ \(2, 3\) మూడు వ్యవస్థ,

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

Question Number: 52  Question Id: 4557344372  Question Type: MCQ  Display Question Number: Yes Single Line Question Option: No  Option Orientation: Vertical

The centre of the circle which intersects the circle \(x^2 + y^2 - 2x - 2y - 2 = 0\) orthogonally and passes through the point \((2, 0)\) and touches the X-axis is

\(x^2 + y^2 - 2x - 2y - 2 = 0\) మూడు వ్యవస్థ మూడు వ్యవస్థ \((2, 0)\) మూడు వ్యవస్థ మూడు వ్యవస్థ

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

Question Number : 53  Question Id : 4557344373  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If from any point on the circle $x^2 + y^2 + 2gx + 2fy + c = 0$, tangents are drawn to the circle $x^2 + y^2 + 2gx + 2fy + c \sin^2 \alpha + (g^2 + f^2) \cos^2 \alpha = 0$, \(0 < \alpha < \frac{\pi}{2}\) then the angle between those tangents is

\[
x^2 + y^2 + 2gx + 2fy + c = 0 \quad \text{and} \quad x^2 + y^2 + 2gx + 2fy + c \sin^2 \alpha + (g^2 + f^2) \cos^2 \alpha = 0, \quad \left(0 < \alpha < \frac{\pi}{2}\right)
\]

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

Question Number : 54  Question Id : 4557344374  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the double ordinate of the parabola $y^2 = 8x$ is of length 16, then the angle subtended by it at the vertex of the parabola is

\[
y^2 = 8x \quad \text{and} \quad y = 16 \quad \text{is} \quad 16 \quad \text{at} \quad \text{the} \quad \text{vertex} \quad \text{of} \quad \text{the} \quad \text{parabola}
\]
If $P$ and the origin are the points of intersection of the parabolas $y^2 = 32x$ and $2x^2 = 27y$, and if $\theta$ is the acute angle between these curves at $P$ then $5\sqrt{\tan \theta} = \ ?$

Options:
1. $\frac{\pi}{2}$
2. $\frac{\pi}{3}$
3. $\frac{3\pi}{4}$
4. $\frac{\pi}{4}$

If the latus rectum of an ellipse subtends a right angle at the centre of that ellipse, then the eccentricity of that ellipse is 

Options:
1. $\sqrt{2}$
2. $2\sqrt{2}$
3. $3\sqrt{2}$
4. $3$
If the tangent at the point \((1, 2)\) on the ellipse \(3x^2 + 4y^2 = 19\) is also a tangent to the parabola \(y^2 - kx = 0\), then \(k = \) 

Options:

1. \(\frac{57}{16}\)
2. \(\frac{-57}{64}\)
3. \(\frac{57}{64}\)
4. \(\frac{-57}{16}\)
If the equation of one asymptote of the hyperbola \( 14x^2 + 38xy + 20y^2 + x - 7y - 91 = 0 \) is \( 7x + 5y - 3 = 0 \), then the other asymptote is

\[
14x^2 + 38xy + 20y^2 + x - 7y - 91 = 0 \text{ का निर्देशांक एक अस्मृतव्यक्ति अस्मृत का अस्मृतप्रति}
\]

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

If the mid points of the sides \( AB, BC, CA \) of a triangle are \((1, 5, -1), (0, 4, -2), (2, 3, 4)\) respectively, then the length of the median drawn from \( C \) to \( AB \) is

\[
(2) \text{ (निर्देशांक निर्देश)}, \text{ जिनमें } AB, BC, CA \text{ का मध्य अंक } (1, 5, -1), (0, 4, -2), (2, 3, 4) \text{ हैं सामान्य, } C \text{ की } AB \text{ के मध्य अंक के बीच की दूरी}
\]

Options:
1. \( \sqrt{29} \)
2. \( \sqrt{27} \)
3. \( \sqrt{5} \)
4. 5

(Not translated as it's in a different language)
If a line makes angles $\frac{\pi}{4}$ and $\frac{\pi}{3}$ with Y-axis and Z-axis respectively, then the obtuse angle made by that line with X-axis is

$$\frac{\pi}{4} + \frac{\pi}{3}$$

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

The equation of the plane bisecting the line segment joining the points $(2, 0, 6)$ and $(-6, 2, 4)$ and perpendicular to it, is

$(2, 0, 6) + \lambda(-6, 2, 4)$

Options:
1. $2x - y + 4z - 15 = 0$
2. $4x - y + 3z - 6 = 0$
3. $4x - y + z + 4 = 0$
4. $x - 2y + 3z - 11 = 0$
\[
\lim_{x \to 0} \frac{\sqrt{1 + x \sin x} - \sqrt{\cos x}}{\tan^2 2x} =
\]
Options:
1. 3
2. \frac{3}{2}
3. \frac{3}{4}
4. \frac{3}{16}

If the function \( f \) defined by \( f(x) = \begin{cases} 
\cos x & \text{if } x \leq 0, \\
3x + \alpha & \text{if } 0 < x < 2, \\
\beta x + 3 & \text{if } 2 \leq x \leq 4, \\
11 & \text{if } x > 4 
\end{cases} \) where \( \alpha \) and \( \beta \) are real constants, is continuous on \( \mathbb{R} \), then \( \alpha^2 + \beta^2 = \)

Options:
1. 3
2. 9
3. 5
If \( f : [0, 3] \rightarrow [0, 3] \) is defined by \( f(x) = \begin{cases} 
1 + x, & 0 \leq x \leq 2 \\
3 - x, & 2 < x \leq 3 
\end{cases} \)
then \( f \circ f \) is

\[
f : [0, 3] \rightarrow [0, 3] \text{ is defined by } f(x) = \begin{cases} 
1 + x, & 0 \leq x \leq 2 \\
3 - x, & 2 < x \leq 3 
\end{cases}
\]

Options:

1. Continuous at \( x = 1 \)
2. Continuous at \( x = 2 \)
3. Discontinuous at \( x = 1 \) and \( x = 2 \)
4. Continuous on \([0, 3]\)

If \( f : \mathbb{R} \rightarrow \mathbb{R} \) is a differentiable function such that \( f(x + y) = f(x)f(y) \) for all \( x, y \in \mathbb{R} \) and if \( f'(4) = 24 \) and \( f'(0) = 3 \), then \( f(4) = \)

\[
f : \mathbb{R} \rightarrow \mathbb{R} \text{ is a function such that } f(x + y) = f(x)f(y) \text{ for all } x, y \in \mathbb{R} \text{ and if } f'(4) = 24, f'(0) = 3 \text{ then } f(4) =
\]

Options:

1. 72
Question Number : 66  Question Id : 4557344386  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[
\frac{d}{dx} \left[ x^{\sin x} + (\sin x)^x \right] =
\]

Options :

1. \[x^{\sin x} \left( \frac{\sin x}{x} + \cos x \log x \right) + (\sin x)^x \left( x \tan x + \log (\sin x) \right)\]

2. \[x^{\sin x} \left( x \tan x + \cos x \log x \right) + (\sin x)^x \left( \frac{\sin x}{x} + \log (\sin x) \right)\]

3. \[x^{\sin x} \left( \frac{x}{\sin x} + \cos x \log x \right) + (\sin x)^x \left( x \cot x + \log (\sin x) \right)\]

4. \[x^{\sin x} \left( \frac{\sin x}{x} + \sin x \log x \right) + (\sin x)^x \left( x \cot x + \log (\cos x) \right)\]

Question Number : 67  Question Id : 4557344387  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( x = a(t + \sin t) \) and \( y = a(1 - \cos t) \), then \( \frac{d^2y}{dx^2} = \)

\( x = a(t + \sin t), \quad y = a(1 - \cos t), \quad \frac{d^2y}{dx^2} = \)

Options :

1. \[\frac{1}{4a \sin^4 \left( \frac{t}{2} \right)}\]
Question Number : 68  Question Id : 4557344388  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If $\theta$ is an angle between the curves $x^2 + 4y = 0$ and $xy = 2$, then $\tan \theta =$

$x^2 + 4y = 0$ మధ్యం యొంది $xy = 2$ కు మధ్యం యొంది అంటే, $\theta$ వంటిసి, $\tan \theta =$

Options :
1. $-1$
2. $\frac{1}{3}$
3. $\frac{1}{2}$
4. $3$

Question Number : 69  Question Id : 4557344389  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the function $f(x) = x^3 + 2px^2 + 27x + 16$ is strictly increasing for all $x \in \mathbb{R}$, then the range of $p$ is

ప్రతి $x \in \mathbb{R}$ కు $f(x) = x^3 + 2px^2 + 27x + 16$ అంటే, $p$ లోని రాంభం

Options :
1. $\left(-\infty, \frac{-9}{2}\right) \cup \left(\frac{9}{2}, \infty\right)$
2. \((-\infty, -9) \cup (9, \infty)\)

3. \(\left(-\frac{9}{2}, \frac{9}{2}\right)\)

4. \((-9, 9)\)

Question Number : 70 Question Id : 4557344390 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If \(f(x) = \frac{1}{\sqrt{x}}\) and \(g(x) = \frac{1}{\sqrt{x}}\) for \(x \in [3, 12]\), then the value of \(c \in (3, 12)\) for which

\[
\frac{f'(c)}{g'(c)} = \frac{f(12) - f(3)}{g(12) - g(3)}
\]

holds, is

\[x \in [3, 12] \quad f(x) = \sqrt{x} \quad g(x) = \frac{1}{\sqrt{x}} \quad \frac{f'(c)}{g'(c)} = \frac{f(12) - f(3)}{g(12) - g(3)}
\]

\(c \in (3, 12)\) 

Options :
1. 7.5
2. 4.8
3. 6
4. 9

Question Number : 71 Question Id : 4557344391 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the distance \(s\) described in time \(t\) by a particle moving on a straight line is given by \(s = t^5 - 40t^3 + 30t^2 + 80t - 250\), then its minimum acceleration is

\[s = t^5 - 40t^3 + 30t^2 + 80t - 250\]

Options :
1. 260
2. -260
3. 130
4. -130

Question Number : 72  Question Id : 4557344392  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( g\left( \frac{t+1}{2t+1} \right) = t + 1 \), then \( \int g(x) \, dx = \)

\( g\left( \frac{t+1}{2t+1} \right) = t + 1 \equiv \cos \, \theta \), \( \int g(x) \, dx = \)

Options :

1. \( \frac{x^2}{2} + c \)
2. \( \log_a (2x-1) + \frac{1}{2} \log_a |(x+1)| + c \)
3. \( \frac{1}{2} \log_a \left| \frac{x+1}{2x+1} \right| + c \)
4. \( \frac{x}{2} + \frac{1}{4} \log_a |2x-1| + c \)

Question Number : 73  Question Id : 4557344393  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\( \int \frac{x^5}{x^4 - 3x^2 + 3} \, dx = \)

Options :

1. \( \frac{x^6}{4} + x^3 + 6x^2 + c \)
2. \( \frac{x^5}{5} + \frac{x^4}{4} + 6x + c \)
3. \( \frac{x^5}{5} + x^3 + 6x + c \)
\[ \frac{x^5}{5} - \frac{x^3}{2} + 6x^2 + c \]

Question Number : 74  Question Id : 4557344394  Question Type : MCQ  Display Question Number : Yes  Single Line Question  Option : No  Option Orientation : Vertical

\[ \int \frac{x^4 + 1}{1 + x^6} dx = \]

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

Question Number : 75  Question Id : 4557344395  Question Type : MCQ  Display Question Number : Yes  Single Line Question  Option : No  Option Orientation : Vertical

\[ \int (\log x)^3 x^5 dx = \]

Options :
1. \( x^6 \left[ \frac{(\log x)^3}{12} - \frac{1}{6} (\log x)^2 + \frac{1}{6} \log x - \frac{1}{36} \right] + c \)
2. \( x^6 \left[ \frac{(\log x)^3}{6} - \frac{1}{18} (\log x)^2 + \frac{\log x}{12} - \frac{1}{36} \right] + c \)
3. \( x^6 \left[ \frac{(\log x)^3}{6} + \frac{1}{12} (\log x)^2 - \frac{\log x}{12} + \frac{1}{36} \right] + c \)
4. \( x^6 \left[ \frac{(\log x)^3}{6} - \frac{(\log x)^2}{12} + \frac{\log x}{36} - \frac{1}{216} \right] + c \)
Question Number : 76  Question Id : 4557344396  Question Type : MCQ  Display Question Number : Yes  Single Line Question  Option : No  Option Orientation : Vertical

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

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

---

Question Number : 77  Question Id : 4557344397  Question Type : MCQ  Display Question Number : Yes  Single Line Question  Option : No  Option Orientation : Vertical

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

Options :
1. \(\sqrt{2} \cos^{-1}\left(\frac{1}{\sqrt{3}}\right)\)
2. \(\frac{1}{\sqrt{2}} \sin^{-1}\left(\frac{1}{\sqrt{5}}\right)\)
3. \(\sqrt{2} \sin^{-1}\left(\frac{1}{\sqrt{3}}\right)\)
4. \(\sqrt{2} \sin^{-1}\left(\sqrt{3}\right)\)

---

Question Number : 78  Question Id : 4557344398  Question Type : MCQ  Display Question Number : Yes  Single Line Question  Option : No  Option Orientation : Vertical
The area (in square units) bounded by the curves $y = 2x^2$ and $y = \operatorname{Max} \{x - [x], x + |x|\}$ in between the lines $x = 0$ and $x = 2$ is

$x = 0 \text{ లక్ష్యం కండి } x = 2 \text{ పై కండి } y = 2x^2 \text{ లాదాదు యే } y = \operatorname{Max} \{x - [x], x + |x|\} \text{ రెండూ దిగుమతి}

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

Question Number : 79  Question Id : 4557344399  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical

If $a$ and $b$ are arbitrary constants, then the differential equation having $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ as its general solution is

$a, b ఎంపై లాదాదు పైధానాం, \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 కు ఇంద్రం ఇంటికి సరిహద్దు అంశాలు లాదాదు

Options :
1. \( \left( \frac{d^2 y}{dx^2} \right)^2 = \left[ 1 + \left( \frac{dy}{dx} \right)^2 \right] \)
2. \( (x^2 - y^2) \frac{d^2 y}{dx^2} - 2xy \frac{dy}{dx} - y = 0 \)
3. \( xy \frac{d^2 y}{dx^2} + x \left( \frac{dy}{dx} \right)^2 - y \frac{dy}{dx} = 0 \)
The general solution of the differential equation \( \frac{dx}{dy} + \frac{x}{y} = x^2 \) is

\[\frac{dx}{dy} + \frac{x}{y} = x^2 \]

Options:

1. \( \frac{1}{y} = cx - y \log x \)
2. \( \frac{1}{x} = cy + x \log x \)
3. \( \frac{1}{x} = cy - y \log y \)
4. \( \frac{1}{y} = cx + y \log x \)
If ‘A’ represents Boltzmann constant, ‘B’ represents Planck’s constant and ‘C’ represents speed of light in vacuum, then the quantity having the dimensions of \(A^4 B^{-3} C^{-2}\) is:

\[\text{A’ప్రకారం భోల్స్మాన్ నంది ఉంది, ‘B’ ప్లాన్క్ నంది ఉంది అంటే ‘C’ లేంది ఉంది, అంటే నంది ఉంది, A^4 B^{-3} C^{-2} నంది ఉంది ఉంది ఉంది.}\]

Options:
1. Universal gas constant
2. Specific heat capacity
3. Stefan’s constant
4. Heat energy

The motion of a particle along a straight line is described by the function \(x = (2t-3)^2\) where \(x\) is in metres and \(t\) is in seconds. The acceleration of the particle at \(t = 2\) s is:

\[x = (2t-3)^2 \text{ metres}\]

Options:
1. 1 ms\(^{-2}\)
2. 4 ms\(^{-2}\)
3. 8 ms\(^{-2}\)
4. 7 ms\(^{-2}\)
A particle moves in the x-y plane with velocity $\mathbf{v} = x \hat{i} + y \hat{j}$; at $t = \frac{x \sqrt{3}}{y}$, the magnitudes of tangential and normal accelerations, respectively are

\begin{align*}
& \sqrt{3}y, \quad \frac{y}{2} \\
& \frac{\sqrt{2}y}{3}, \quad \frac{\sqrt{3}y}{2} \\
& \frac{\sqrt{3}y}{2}, \quad \frac{5y}{2} \\
& 2\sqrt{3}y, \quad \frac{11y}{\sqrt{3}}
\end{align*}

Options:

1. $\frac{\sqrt{3}y}{2}, \frac{y}{2}$
2. $\frac{\sqrt{2}y}{3}, \frac{\sqrt{3}y}{2}$
3. $\frac{\sqrt{3}y}{2}, \frac{5y}{2}$
4. $2\sqrt{3}y, \frac{11y}{\sqrt{3}}$

Question Number : 84  Question Id : 4557344404  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Assertion (A): The speed of a body in uniform circular motion is constant.
Reason (R): In uniform circular motion, the acceleration of the body is constant.

Options:

1. Both (A) and (R) are true and (R) is the correct explanation of (A)
2. Both (A) and (R) are true but (R) is not the correct explanation of (A)
One end of a light string is fixed to a clamp on the ground and the other end passes over a fixed frictionless pulley as shown in the figure. It makes an angle of 30° with the ground. The clamp can tolerate a vertical force of 40 N. If a monkey of mass 5 kg were to climb up the rope then the maximum acceleration in the upward direction with which it can climb safely is \( g = 10 \text{ ms}^{-2} \)

Options:
1. 2 ms\(^{-2}\)
2. 4 ms\(^{-2}\)
3. 6 ms\(^{-2}\)
4. 8 ms\(^{-2}\)
In the arrangement shown in the figure, if the blocks of masses 'm' and '2m' are released from the state of rest, tension in the string is \( (\mu = \text{coefficient of friction, string is massless and inextensible, pulley is frictionless}) \)

\[ \mu = \frac{2}{3}, \quad 45^\circ \]

Options:
1. mg
2. \( \sqrt{2} \) mg
3. \( \frac{2\sqrt{2}mg}{3} \)
4. \( \frac{\sqrt{2}mg}{3} \)
A stone of mass 2 kg tied to a light inextensible string of length $\frac{5}{3}$ m is whirling in a circular path in a vertical plane. If the ratio of the maximum tension to the minimum tension in the string is 4, then the speed of the stone at the highest point of the circle is _______ ($g = 10$ ms$^{-2}$)

$$2 \text{ kg పంతాయిత్యం కు ఇంకా లేదు} \frac{5}{3} \text{ m పరిమితంలో పరిపాలించడానికి సందర్శించబడిన రేటు యొక్క అంశం ఉండి యొక్క రేటు}
$$

(\text{Ratio of maximum tension to minimum tension} = 4)

$$\text{Then the speed of the stone at the highest point of the circle is}$$

$$\text{_______}$$

($g = 10$ ms$^{-2}$)

Options:
1. 20 ms$^{-1}$
2. $10\sqrt{3}$ ms$^{-1}$
3. $\sqrt{50}$ ms$^{-1}$
4. 10 ms$^{-1}$

A ball falls freely from a height of 180 m on to a hard horizontal floor and repeatedly bounces. If the coefficient of restitution is 0.5, the average speed and average velocity of the ball before it ceases to rebound are respectively

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

$$180 \text{ m కట్ట చేసి పంతాయిత్యం కు ఇంకా లేదు ఒడిస్టి ఉండి అంటే ఎంతో పండుముడం కట్టి సమేత ఉండి చేసి ఎంతో పండుముడం ఉండి చేసి
$$

(\text{Coefficient of restitution} = 0.5)

$$\text{Average speed and average velocity of the ball before it ceases to rebound are}$$

$$\text{_______}$$

($g = 10$ ms$^{-2}$)

Options:
1. 10 ms$^{-1}$, 10 ms$^{-1}$
2. $50$ ms$^{-1}$, $\frac{50}{3}$ ms$^{-1}$
\[
\begin{align*}
3. & \quad \frac{50}{3} \text{ ms}^{-1}, \ 10 \text{ ms}^{-1} \\
4. & \quad \frac{20}{3} \text{ ms}^{-1}, \ \frac{50}{3} \text{ ms}^{-1}
\end{align*}
\]

Question Number : 89  Question Id : 4557344409  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A circular disc of radius ‘R’ is removed from one end of a bigger circular disc of radius ‘2R’. The centre of mass of the new disc is at a distance ‘αR’ from the centre of the bigger disc. The value of ‘α’ is

‘R’ లపేదికి సమీపంలో ఉన్నది ‘2R’ ములుగుదైన స్థానంలో ఉన్నది ‘R’ మిత్రం డీస్ కూడా ఉంది. ఎందుకంటే మిచ్చితో విస్తరించబడింది రహస్యం ఉంది లింగాలు నిర్ధారించబడాలి ‘αR’ యొక్క లక్షణం

Options :

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

Question Number : 90  Question Id : 4557344410  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
In the figure shown, acceleration with which the mass ‘m’ falls down when released is (consider the string to be massless, g-acceleration due to gravity)

At $t = 0$, a particle executing SHM with a time period 3 s is in phase with another particle executing SHM. The time period of the second particle is $T$ (less than 3 s). If they are again in the same phase for the third time after 45 s, then the value of $T$ is ______

Options:

1. $\frac{2g}{3}$
2. $\frac{5g}{6}$
3. $g$
4. $\frac{g}{2}$
A body is projected vertically upwards from the surface of the Earth with a velocity sufficient to carry it to infinity. The time taken by it to reach a height of three times the radius of the Earth is

(Acceleration due to gravity = \(9.8 \text{ ms}^{-2}\) and radius of the Earth = 6400 km)

Options:
1. 44.44 minutes
2. 44.44 మినుట్స్
3. 22.22 minutes
4. 22.22 మినుట్స్
5. 18.76 minutes
6. 18.76 మినుట్స్
7. 37.52 minutes
8. 37.52 మినుట్స్
A copper wire of cross-sectional area 0.01 cm² is under a tension of 22 N. The decrease in the cross-sectional area is (Young modulus = $1.1 \times 10^{11}$ Nm⁻², Poisson's ratio = 0.32)

0.01 cm² విస్తీర్ణం కలుగుతున్నది కాగా ఆ సమయం 22 N జాతిస్తుంది కాబట్టి అంచుకు దేశాజ్ఞా ద్రవ్యమిత్తం లేతా దేశాజ్ఞా ద్రవ్యమిత్తం
(యంటియుడు మిది = $1.1 \times 10^{11}$ Nm⁻², పొస్సన్ రాశు = 0.32)

Options:
1. $0.128 \times 10^{-6}$ cm²
2. $128 \times 10^{-6}$ cm²
3. $12.8 \times 10^{-6}$ cm²
4. $1.28 \times 10^{-6}$ cm²

When a soap bubble of radius 0.2 mm is charged, it experiences an outward electrostatic pressure of magnitude $\frac{\sigma^2}{2\varepsilon_0}$ where $\sigma = 20 \mu$Cm⁻² is the surface charge density. If the excess pressure inside the soap bubble due to the surface tension is same as this electrostatic pressure, then the surface tension of the soap solution is

$\varepsilon_0 = 8.85 \times 10^{-12}$ C²Nm⁻²⁻¹

0.2 mm మిమీ వ్యాస కలుగుతున్నది వంటకను సైనిక విస్తీర్ణం లేతా $\frac{\sigma^2}{2\varepsilon_0}$ ప్రకారం మిది మిది వంటకను సైనిక విస్తీర్ణం ఫలితం లేతా దేశాజ్ఞా ద్రవ్యమిత్తం
($\varepsilon_0 = 8.85 \times 10^{-12}$ C²Nm⁻²⁻¹)

Options:
1. $8.85 \times 10^{-4}$ Nm⁻¹
1. $12.4 \times 10^{-4}$ Nm$^{-1}$
2. $11.3 \times 10^{-4}$ Nm$^{-1}$
3. $90 \times 10^{-4}$ Nm$^{-1}$

Question Number : 95  Question Id : 4557344415  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The temperature of a spherical black body is inversely proportional to its radius. If its radius is doubled then the power radiating from it will be

1. $\frac{1}{4}$ times of initial value
2. Halved
3. $4$ times of initial value
4. $\frac{1}{4}$ times of initial value

Question Number : 96  Question Id : 4557344416  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A metal sphere immersed in water weighs $W_1$ at $0$ °C and $W_2$ at $50$ °C. The coefficient of cubical expansion of the metal is less than that of water. Then

1. $W_1$ and $W_2$
2. $W_1$ and $W_2$
3. $W_1$ and $W_2$
4. $W_1$ and $W_2$
A reversible Carnot heat engine converts $\frac{1}{4}$th of its input heat into work. When the temperature of the sink is reduced by 50 K, its efficiency becomes $33\frac{1}{3}$%. The initial temperatures of the source and the sink respectively are

Options:
1. 600 K, 550 K
2. 600 K, 450 K
3. 300 K, 150 K
4. 450 K, 350 K
An ideal monatomic gas is carried along the cycle ABCDA as shown in the figure. The total heat absorbed during this process is

![Diagram of the cycle ABCDA]

Options:
1. \(10.5 P_0V_0\)
2. \(7.5 P_0V_0\)
3. \(2.5 P_0V_0\)
4. \(1.5 P_0V_0\)

The ratio of the speed of sound in a monatomic gas at 27 °C and rms speed of the molecules of the same gas at a temperature of 127 °C is _______

27 °C లో వ్యాసంలో అవుతున్న అమరిక భాగం ప్రతి పరిధి, 127 °C లో అమరిక భాగం ప్రతి పరిధి జాతి సూక్తి సూక్తి పరిమితి రమ్స్ స్పీడ్ ను బయట చేయాలి _______

Options:

1. \(1 : 2\)
2. \(\sqrt{5} : \sqrt{12}\)
3. \(3 : 4\)
Two uniform stretched steel strings A and B are vibrating under the same tension. The first overtone of A is equal to the second overtone of B. If the radius of A is twice that of B, then the ratio of the lengths of the strings is ________

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

A open pipe of length \( 7 \) is vibrating in 3rd overtone with maximum amplitude \( 'A' \). The amplitude at a distance of \( \frac{7}{16} \) from any open end is ________

Options:
1. A
2. 0
3. \( \frac{A}{\sqrt{2}} \)
Question Number : 102  Question Id : 4557344422  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
Magnifying power of an astronomical telescope for normal adjustment is 10 and length of the telescope is 110 cm. Magnifying power of the same telescope when the image is formed at the near point is

Options :
1. 14
2. 18
3. 23
4. 26

Question Number : 103  Question Id : 4557344423  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
In Young's double slit experiment, the two slits are illuminated by a light beam consisting of wavelengths 4200 Å and 5040 Å. If the distance between the slits is 2.4 mm and the distance between the slits and the screen is 200 cm, the minimum distance from the central bright fringe to the point where the bright fringes due to both the wavelengths coincide is ________

Options :
1. 0.7 mm
2. 1.4 mm
3. 2.1 mm
Flux coming out from a positive charge of $8 \, \text{C}$, placed in a medium of dielectric constant $4$ is

$$\varepsilon_0 \cdot 4 \cdot 8 \varepsilon_0$$

Options:
1. $2 \varepsilon_0$
2. $\varepsilon_0$
3. $8 \varepsilon_0$
4. $32 \varepsilon_0$

Two charged particles each of mass $9.8 \, \text{g}$ and charges $+20 \, \mu\text{C}$ and $-20 \, \mu\text{C}$ are attached to the two ends of a massless and rigid uniform non-conducting rod of length $50 \, \text{cm}$. This arrangement is held in a uniform electric field of $12.1 \, \text{NC}^{-1}$ such that the rod makes a very small angle with the field direction. If the rod is set free, the minimum time needed for the rod to become parallel to the direction of the electric field is _____ seconds.

$50 \, \text{cm}$ వంతె లేకుంటే అది ప్లంగఫి ఆవిష్కరణ పైకు విస్తృతి అంటే వంతె లేకుంటే విస్తృతి లోకం. $9.8 \, \text{g}$ లేదా $+20 \, \mu\text{C}$ లేదా $-20 \, \mu\text{C}$ అదిష్టము గ్రామానికంగా వచ్చింది. ఈ గ్రామానికం $12.1 \, \text{NC}^{-1}$ వంతె విలుగు విస్తృతి కలబెదుగా. అది ప్యాన్సు లేదా విరుద్ధం ఉంటే, ఆ ఎమైగిని విస్తృతి విస్తృతి మాత్రమే లేదా విస్తృతి లేదా ______ వంతె.
Four capacitors of capacitances 2 μF, 3 μF, 4 μF and x μF are connected to a battery of emf 6 V and of negligible internal resistance, as shown in the figure. If the ratio of the charges on x μF and 4 μF capacitances is \( \frac{3}{8} \), then the value of x is ______.

2 μF, 3 μF, 4 μF అంటెలు x μF రాశిలు కూడా తెలుగు సంఖ్యలను మిగిలిస్తే అంటెలు 6 V emf కూడా తెలుగు సంఖ్యలను మిగిలిస్తే రాశిలు మిగిలిస్తే. x μF అంటెలు 4 μF వర్గాన్ని రాశిలు మిగిలిస్తే \( \frac{3}{8} \) అంటెలు x అంటెలు ______

Options:
1. 2
2. 5
3. 3
4. 8
The plates of a parallel plate capacitor are charged upto 100 V. A 2 mm thick insulator sheet is inserted between the plates. Then to maintain the same potential difference the distance between the plates is increased by 1.6 mm. The dielectric constant of the insulator is

Options:
1. 6
2. 8
3. 5
4. 4

In the given circuit, current $I$ is independent of the resistance $R_6$. Then

Options:
1. $R_1 R_2 R_5 = R_3 R_4 R_6$
\[ \frac{1}{R_5} + \frac{1}{R_6} = \frac{1}{R_1 + R_2} + \frac{1}{R_3 + R_4} \]

3. \( R_1 R_4 = R_2 R_3 \)

4. \( R_1 R_3 = R_2 R_4 \)

**Question Number : 109  Question Id : 4557344429  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A fuse wire of radius 0.2 mm blows off with a current of 5 A. The fuse wire of same material but of radius 0.3 mm will blow off with a current of __________

0.2 mm లో ప్రచ్చిందంగా ఉంది అదే శరీర మూలముగా 5 A బంగా ఉండవచ్చు కారణం. అదే రకాని వైపు నీటి 0.3 mm లో ప్రచ్చిందంగా ఉంది అదే మూలముగా రాసిని వైపు ఉండవచ్చు __________

**Options :**

1. \( \frac{15}{2} \) A

2. \( \frac{5\sqrt{3}}{2} \) A

3. \( \frac{5\sqrt{27}}{8} \) A

4. 5 A

**Question Number : 110  Question Id : 4557344430  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**
A circular loop and an infinitely long straight conductor carry equal currents, as shown in the figure. The net magnetic field at the centre of the loop is \( B_1 \) when the current in the loop is clock-wise and \( B_2 \) when the current in the loop is anti-clock-wise. Then \( \frac{B_1}{B_2} \) is

\[
\frac{B_1}{B_2} =
\]

Options:

1. \( \frac{15}{19} \)
2. \( \frac{13}{15} \)
3. \( \frac{13}{17} \)
4. \( \frac{17}{19} \)
Two circular loops of diameters 0.6 cm and 40 cm are kept coaxially with a separation of 15 cm between their centers. If a current 2 A flows through the smaller loop, the flux linked with the bigger loop is (approximately)

0.6 cm మిమెట్స్ 40 cm మిమెట్స్ కంటే తొలి వాటి స్పటకాలు చేసి దిశ నిర్ధారించాడు 15 cm స్పటకాలు నించి తొలి వాటి స్పటకాలు నించాడు. 2 A పరిమాణ వాటి సమానం వాటి స్పటకాలు నించాడు మొదలరు, ఏందుకంటే మిలిమెట్రుల నించాడు అంచనాసం (గిరుచారా)

Options:
1. $9.0 \times 10^{-11}$ Wb
2. $0.9 \times 10^{-11}$ Wb
3. $1.8 \times 10^{-11}$ Wb
4. $2.7 \times 10^{-11}$ Wb

Question Number : 112  Question Id : 4557344432  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In the magnetic meridian of a certain place, the vertical component of the earth’s magnetic field is 0.3464 G and the dip angle is 30°. The horizontal component of the earth’s magnetic field at this location is _______

మాద్రిత ప్యాడి అనేదియూరు పాడి తుంద యొక్క దిశ నించాడు 0.3464 G మిగిలి కర్తు దిశ నించాడు 30°. అ మిగిలి కర్తు యొక్క దిశ నించాడు అంచనాసం _______

Options:
1. 0.4 G
2. 0.6 G
3. 0.7 G
4. 0.8 G

Question Number : 113  Question Id : 4557344433  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A current carrying circular loop is perpendicular to a magnetic field of induction \(10^{-4}\) T. If the radius of the loop starts shrinking at a uniform rate of \(2\) mm s\(^{-1}\), then the emf induced in the loop at the instant when its radius is \(20\) cm will be ________

Options:
1. \(0.02\ \pi\ \mu V\)
2. \(0.08\ \pi\ \mu V\)
3. \(0.03\ \pi\ \mu V\)
4. \(0.05\ \pi\ \mu V\)

A resistor and an inductor are connected in series to an ac source of voltage \(150\ \sin (100\ \pi t + \pi)\) volt. If the current in the circuit is \(5\ \sin \left(100\pi t + \frac{2\pi}{3}\right)\) ampere then the average power dissipated and the resistance of the resistor are respectively ________

Options:
1. \(187.5\) W, \(30\ \Omega\)
2. \(187.5\) W, \(15\ \Omega\)
3. \(375\) W, \(30\ \Omega\)
4. \(375\) W, \(15\ \Omega\)
An electromagnetic wave of frequency 45 MHz travels in free space along X-axis. At some point and at some instant, the electric field has a maximum value of 750 NC\(^{-1}\) along Y-axis. The magnetic field at this position and time is

45 MHz బ్రాండా అవసరమైన ఎందుకు రెండు సందర్భాలు ప్రత్యేకమైన X-అకుష్య మరియు Y-అకుష్య మైదానాలు. ఇది సాధారణ అవసరం ఉండదు 750 NC\(^{-1}\) ప్రతి ప్రత్యేకమైన ఎందుకు కెన్ద్రం లో కనుగొనబడింది.

Options:
1. \(2.5 \times 10^{-6} \hat{j} \text{ T}\)
2. \(5 \times 10^{-6} \hat{k} \text{ T}\)
3. \(2.5 \times 10^{-6} \hat{k} \text{ T}\)
4. \(2.5 \times 10^{-6} \hat{j} \text{ T}\)

When light of frequency ‘\(\nu\)’ incidents on two metallic plates A and B, photo electrons are emitted. If the work function of A is more than that of B, the correct curve of the following curves drawn between stopping potential ‘\(V\)’ and incident frequency ‘\(\nu\)’ is


Options:

![Graph](image-url)
The approximate value of principal quantum number for a circular orbit of hydrogen atom of radius 530 nm is

530 nm రాడియాన్ యొక్క గొడుగు కోసం ప్రధాన కుండా కలపవలెందుటుంది. ఇది ప్రామాణిక కూడా వెంటి కావసాగించడానికి దృష్టించండి.

Options:
1. 26
2. 100
3. 200
4. 21
A radioactive element ‘X’ converts into another stable element ‘Y’. Half life of X is 2 hours. Initially only X is present. After a time ‘t’, if the ratio of atoms of X to Y is 1 : 4 then the value of ‘t’ is

Options:
1. 2 hours
2. 4 hours
3. 6 hours
4. Between 4 hours and 6 hours
Match the following List-I and List-II

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Small Scale Integration (SSI)</td>
<td>I) Logic gates &lt; 100</td>
</tr>
<tr>
<td>B) Medium Scale Integration (MSI)</td>
<td>II) Logic gates &gt; 1000</td>
</tr>
<tr>
<td>C) Large Scale Integration (LSI)</td>
<td>III) Logic gates ≤ 10</td>
</tr>
<tr>
<td>D) Very Large Scale Integration (VLSI)</td>
<td>IV) Logic gates &lt; 1000</td>
</tr>
</tbody>
</table>

The correct answer is:

Options:

1. II III I IV
2. IV I II III
3. I IV III II
4. III I IV II
A modulated signal is given by \( C_m(t) = A_c \sin \omega_c t + \mu A_c \sin \omega_m t \sin \omega_c t \) where \( \mu \) is modulation index. To keep the signal without distortion, the value of \( \mu \) should be

Options:

1. \( > 1 \)
2. \( \geq 1 \)
3. \( = 1 \)
4. \( \leq 1 \)

The work functions \((W_0)\) of K, Na, Li, Mg and Cu are 2.25, 2.30, 2.42, 3.70 and 4.80 eV respectively. How many of these metals do not undergo photoelectric effect when a radiation of wavelength 450 nm is allowed to fall on them? \((1 \text{ eV} = 1.602 \times 10^{-19} \text{ J})\)

K, Na, Li, Mg, Cu యి శిషిత సహాయంతో \((W_0)\) హిందా 2.25, 2.30, 2.42, 3.70, 4.80 eV అయి. 450 nm తో ప్రాంతం కు ఎంపికించడానికే ప్రతి పదార్ధం యొక్క కంప్యూటర్ ప్రాంతం ప్రవహించడానికే యొక్క ప్రతి పదార్ధం యొక్క కంప్యూటర్ ప్రవహించడానికే అనే కంప్యూటర్ ప్రవహించడానికే?

Options:

1. 2
2. 1
3. 3
4. 5
Number of completely filled orbitals in Xenon atom (Xe) is

Options:
1. 17
2. 18
3. 27
4. 28

The mass numbers of two elements X and Z are 52 and 75 respectively. X contains 16.6% more neutrons compared to protons. Z contains 27.3% more neutrons compared to protons. X and Z are respectively

Options:
1. 24Cr, 33As
2. 24Cr, 30Zn
3. 19K, 33As
4. 29Cu, 30Zn
An atom in a molecule has electrons in 1s, 2s, 2p, 3s, 3p, 3d and 4s orbitals. This atom can undergo hybridisations of type

An atom in a molecule has electrons in 1s, 2s, 2p, 3s, 3p, 3d and 4s orbitals. This atom can undergo hybridisations of type

Options:
1. sp^3d^2, sp^3, p^3ds
2. d^2sp^3, p^2ds, dsp^2
3. sp^3, dsp^2, d^2sp^3
4. sp^3, dsp^2, dsp

The bond dissociation energy (E) and bond length (R) of O_2, N_2, F_2 follow the order as

O_2, N_2, F_2 ఉన్నా విధానం ఎందుకు ఎందుకు (E) కమ్మతా ఎందుకు ఎందుకు (R) కమ్మతా కమ్మతా

Options:
1. O_2 > N_2 > F_2
2. N_2 > F_2 > O_2
3. N_2 > O_2 > F_2
4. N_2 > O_2 > F_2
If the RMS speed of nitrogen at a certain temperature is 3000 ms\(^{-1}\), the approximate kinetic energy of one mole of nitrogen at that temperature in kJ is (assume nitrogen as ideal gas)

\[ \text{Options:} \]
1. 9.0
2. 126.0
3. 90.0
4. 12.6

\[ 2\text{Cu}_2\text{O}(s) + \text{Cu}_2\text{S}(s) \rightarrow 6\text{Cu}(s) + \text{SO}_2(g) \]

the oxidant and reductant respectively in the above reaction are

\[ 2\text{Cu}_2\text{O}(s) + \text{Cu}_2\text{S}(s) \rightarrow 6\text{Cu}(s) + \text{SO}_2(g) \]

\[ \text{Options:} \]
1. Oxide of \( \text{Cu}_2\text{O} \) and sulphide of \( \text{Cu}_2\text{S} \)
   \[ \text{Cu}_2\text{O} \text{  ఞక్తుకున్న  } \text{Cu}_2\text{S} \text{  అట్టుపీటు} \]
2. Sulphide of \( \text{Cu}_2\text{S} \) and Oxide of \( \text{Cu}_2\text{O} \)
   \[ \text{Cu}_2\text{S} \text{  ఞక్తుకున్న  } \text{Cu}_2\text{O} \text{  అట్టుపీటు} \]
3. \( \text{Cu (I)} \) of \( \text{Cu}_2\text{O} \), \( \text{Cu}_2\text{S} \) and sulphide of \( \text{Cu}_2\text{S} \)
   \[ \text{Cu}_2\text{O} , \text{Cu}_2\text{S} \text{  ఆట్టుపీటు } \text{Cu (I)} \text{  అట్టుపీటు} \]
4. \( \text{Cu (I)} \) of \( \text{Cu}_2\text{S} \), \( \text{Cu (I)} \) of \( \text{Cu}_2\text{O} \)
   \[ \text{Cu}_2\text{S} \text{  ఆట్టుపీటు } \text{Cu (I)} , \text{Cu (I)} \text{  అట్టుపీటు} \text{Cu}_2\text{O} \text{  ఆట్టుపీటు} \text{Cu (I)} \]
If 1.5 L of an ideal gas at a pressure of 20 atm expands isothermally and reversibly to a final volume of 15 L, the work done by the gas in L atm is

1.5 L 20 atm 15 L 15 L atm 0.026

Options:
1. 69.09
2. 34.55
3. -34.55
4. -69.09

At T(K), the equilibrium constant of \( H_2(g) + I_2(g) \rightleftharpoons 2HI(g) \) is 49. If [H\(_2\)], [I\(_2\)] at equilibrium at the same temperature are 2.0 \times 10^{-2} \text{ M} and 8.0 \times 10^{-2} \text{ M} respectively, the [HI] at equilibrium in mol L\(^{-1}\) is

\( T \) \( H_2(g) + I_2(g) \rightleftharpoons 2HI(g) \) \( K = 49 \). \( [H_2], [I_2] \) \( 2.0 \times 10^{-2} \text{ M}, 8.0 \times 10^{-2} \text{ M} \) \( [HI] \) \( \text{mol L}^{-1}\)

Options:
1. 2.8
2. 0.28
3. 0.14
4. 1.4

If the pH of 0.10 M monobasic acid at 298 K is 5.0, the value of pK\(_a\) at the same temperature is

298 K 0.10 M 5.0 0.10 pH \( \text{mol} \text{L}^{-1} \) \( \text{mol} \text{L}^{-1} \)

Options:
Question Number : 131  Question Id : 4557344451  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Identify the correct statements from the following.

i. The number of hydrogen bonded water molecules in copper sulphate pentahydrate is one.
ii. Lanthanum and zirconium form non-stoichiometric hydrides.
iii. In solid form of H₂O, each oxygen is surrounded by six oxygens in octahedral positions at a distance of 276 pm.

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

Question Number : 132  Question Id : 4557344452  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Observe the following compounds.
CaCO₃ (i), MgSO₄ (ii), BaCl₂ (iii), Sr(NO₃)₂ (iv), MgBr₂ (v), MgCl₂ (vi)
The oxoacid salts of group II elements from the above list are

Options :
1. CaCO₃ (i), MgSO₄ (ii), BaCl₂ (iii), Sr(NO₃)₂ (iv), MgBr₂ (v), MgCl₂ (vi)
2. CaCO₃ (i), MgSO₄ (ii), BaCl₂ (iii), Sr(NO₃)₂ (iv), MgBr₂ (v), MgCl₂ (vi)
3. CaCO₃ (i), MgSO₄ (ii), BaCl₂ (iii), Sr(NO₃)₂ (iv), MgBr₂ (v), MgCl₂ (vi)
4. CaCO₃ (i), MgSO₄ (ii), BaCl₂ (iii), Sr(NO₃)₂ (iv), MgBr₂ (v), MgCl₂ (vi)
A few grams of borax is dissolved in distilled water. The pH range of resultant solution is

1. i, ii, iii, iv, v, vi
2. i, ii, iv
3. iii, v, vi
4. ii, v, vi

An element (X) when burnt in oxygen forms neutral XO and acidic XO₂. The element X is

1. Sn
2. C
3. Ge
4. Pb

X ṣi?
Match the following.

**List - I**
A) Methemoglobinemia  
B) Kidney damage  
C) Bones and teeth damage  
D) Growth of fish is stopped

**List - II**
I) 1 ppm of dissolved oxygen in water  
II) 1000 ppb of lead in drinking water  
III) BOD of drinking water is 2 ppm  
IV) 2000 ppm of nitrates in drinking water  
V) 50 ppm of fluoride in drinking water

The correct answer is

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

Question Number : 136  Question Id : 4557344456  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
In the following three-dimensional structure of CH₄, the bonds are labelled as W, X, Y and Z. The bonds projecting out of the plane are

Identify X and Y in the following reactions

Options:
1. CH₃OH
2. HCO₂H

Options:
1. W, Z
2. X, Z
3. W, Y
4. X, Y
Which one of the following has highest dipole moment?

Options:
1. cis-But-2-ene
2. trans-1, 2-Dichloroethene
3. cis-1, 2-Dichloroethene
4. trans-But-2-ene

If the side length of a face centered unit cell of a metal is 400 pm, approximate radius of the metal in pm is \( \sqrt{2} \times 1.414 \) pm.
If CO₂ gas having a partial pressure of 1.67 bar is bubbled through 1 L water at 298 K, the amount of CO₂ dissolved in water in g L⁻¹ is approximately (Henry’s law constant of CO₂ is 1.67 k bar at 298 K).

1. 24.42
2. 12.21
3. 2.44
4. 1.22

12.25 g of CH₃CH₂CHClCOOH is added to 250 g of water to make a solution. If the dissociation constant of above acid is 1.44×10⁻³, the depression in freezing point of water in °C is (Kᵣ for water is 1.86 K kg mol⁻¹)

1. 0.789
2. 0.394
Question Number : 142  Question Id : 4557344462  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
Assertion (A) : The charge on one mole of electrons is one Faraday.
Reason (R) : The quantity of current required to deposit one mole of Mg from Mg$^{2+}$ electrolyte solution is two Faradays.

Options :
Both (A) and (R) are correct and (R) is the correct explanation of (A).
1. (A) గ్రామం (R) యే సఫలం గ్రామం తో (R) అంటి (A) యే సఫలం విషయం

Both (A) and (R) are correct but (R) is not the correct explanation of (A).
2. (A) గ్రామం (R) యే సఫలం గ్రామం తో (R) అంటి (A) యే సఫలం విషయం

(A) is correct but (R) is not correct.
3. (A) గ్రామం యే (R) యే సఫలం విషయం

(A) is not correct but (R) is correct.
4. (A) గ్రామం యే (R) యే సఫలం విషయం

Question Number : 143  Question Id : 4557344463  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
If the half lives of the first order reaction at 350 K and 300 K are 2 and 20 seconds respectively, the activation energy of the reaction in kJmol$^{-1}$ is

350 K, 300 K యే సఫలం ఇతర సమాచారానికి అడిగావే కావచ్చనం 2, 20 సికింద్రము సమాచారం నండు

Options :
1. 40.2
2. 20.1
3. 60.3
4. 30.2

Which one of the following is present in gas mask?

Options:
1. Silica gel
2. V₂O₅
3. Activated charcoal
4. Fluorescein

The pair of oxides, which can be leached out, when powdered bauxite containing certain impurities is digested with concentrated solution of NaOH at 473 - 523 K temperature and 35 - 36 bar pressure are

Options:
1. TiO₂, SiO₂
2. SiO₂, Al₂O₃
Question Number : 146  Question Id : 4557344466  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Nitrous acid was disproportionated to form water, HNO₃ and X. In another reaction, sodium nitrite was reacted with H₂SO₄ to form NaHSO₄, HNO₃, water and Y. What are X and Y respectively?

Options:
1. NO, N₂O₃
2. NO, NO
3. N₂O, NO₂
4. NO₂, N₂O₅

Question Number : 147  Question Id : 4557344467  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Identify the correct statements from the following
i. Oxygen shows –2, –1, +1, +2 oxidation states.
ii. The thermal stability of H₂O, H₂Se, H₂S follows the order H₂O < H₂S < H₂Se.
iii. The reducing nature of H₂Se, H₂S, H₂Te follows the order H₂S < H₂Se < H₂Te.

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

Question Number : 148  Question Id : 4557344468  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
Which one of the following reactions does not take place?

Which one of the following reactions does not take place?

Options:
1. \( \text{F}_2 + 2\text{Br}^- \rightarrow 2\text{F}^- + \text{Br}_2 \)
2. \( \text{Br}_2 + 2\text{I}^- \rightarrow 2\text{Br}^- + \text{I}_2 \)
3. \( \text{Cl}_2 + 2\text{Br}^- \rightarrow 2\text{Cl}^- + \text{Br}_2 \)
4. \( \text{Br}_2 + 2\text{Cl}^- \rightarrow 2\text{Br}^- + \text{Cl}_2 \)

Question Number : 149  Question Id : 4557344469  Question Type : MCQ  Display Question Number : Yes  Single Line Question
Option : No  Option Orientation : Vertical
Identify the reactions in which dichromate acts as an oxidizing reagent.

Identify the reactions in which dichromate acts as an oxidizing reagent.

Options:
1. I, IV
2. I, III
3. II, III
4. II, IV
Question Number : 150  Question Id : 4557344470  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The green coloured complex ion of nickel in its aqueous solution is

Options :

1. $\left[ \text{Ni(en)}_3 \right]^{2+}$

2. $\left[ \text{Ni(H}_2\text{O)}_2 \text{(en)}_2 \right]^{2+}$

3. $\left[ \text{Ni(H}_2\text{O)}_4 \text{(en)} \right]^{2+}$

4. $\left[ \text{Ni(H}_2\text{O)}_6 \right]^{2+}$

Question Number : 151  Question Id : 4557344471  Question Type : MCQ  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Examples of synthetic polymer (X) and semi-synthetic polymer (Y) are.

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>polythene</td>
<td>rayon</td>
</tr>
<tr>
<td>rayon</td>
<td>nylon 6, 6</td>
</tr>
<tr>
<td>rubber</td>
<td>polythene</td>
</tr>
<tr>
<td>cellulose nitrate</td>
<td>PVC</td>
</tr>
<tr>
<td>PVC</td>
<td></td>
</tr>
</tbody>
</table>
Fisher projection formula of L - (-) - glucose is

\[
\text{CHO} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{H} \quad \text{OH} \\
\text{H} \quad \text{OH} \\
\text{CH}_2\text{OH}
\]

Options:

1. 

\[
\text{CHO} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{H} \quad \text{OH} \\
\text{CH}_2\text{OH}
\]

2. 

\[
\text{CHO} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{CH}_2\text{OH}
\]

3. 

\[
\text{CHO} \\
\text{HO} \quad \text{H} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{CH}_2\text{OH}
\]

4. 

\[
\text{CHO} \\
\text{HO} \quad \text{H} \\
\text{H} \quad \text{OH} \\
\text{HO} \quad \text{H} \\
\text{HO} \quad \text{H} \\
\text{CH}_2\text{OH}
\]
Structure of Ranitidine is

Options:

1. 

2. 

3. 

4. 

What are X, Y and Z in the following reaction

\[ R - OH + PCl_3 \rightarrow X + Y + Z \]

Options:

1. R–Cl  HCl  PCl\(_3\)
2. ROR  H\(_3\)PO\(_3\)  H\(_2\)O
3. R–Cl  H\(_2\)O  PCl\(_3\)
Butanone reacts with methyl magnesium bromide to form an addition product (Z). On hydrolysis Z gives

Options:
1. \( \text{CH}_3\text{CH}_2\text{C} (\text{OH}) (\text{CH}_3) \text{CH}_3 \)
2. \( (\text{H}_3\text{C})_3\text{C} \text{CH}_2\text{OH} \)
3. \( \text{CH}_3\text{CH}_2\text{CH}_2\text{CH} (\text{OH}) \text{CH}_3 \)
4. \( \text{CH}_3\text{CH}_2\text{CH} (\text{CH}_3) \text{CH}_2\text{OH} \)

What are X and Y in the following reactions?

\[ \text{Phenol} \xrightarrow{\text{i) CHCl}_3 / \text{NaOH}} \xrightarrow{\text{ii) H}^+} X \]
\[ \xrightarrow{\text{i) NaOH ii) CO}_2 iii) H}^+} Y \]

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

What are X and Y in the following reaction?

$$\text{CH}_3 - C - \text{OCH}_3 + \text{HI} \rightarrow X + Y$$

Options:

1. $(\text{H}_3\text{C})_3\text{Cl}$  $\text{CH}_3\text{OH}$
2. $\text{CH}_3\text{I}$  $(\text{H}_3\text{C})_3\text{C OH}$
3. $\text{CH}_3 - \text{C} = \text{CH}_2$  $\text{CH}_3\text{I}$
4. $\text{CH}_3 - \text{C} = \text{CH}_2$  $\text{CH}_2\text{O}$
Reagents used in Jarrett reaction (I) and Stephen reaction (II) are:

\[ \text{I} \quad \text{II} \]

Options:
1. PCC \quad \text{SnCl}_2/\text{HCl}
2. \text{SnCl}_2/\text{HCl} \quad \text{CrO}_2\text{Cl}_2
3. \text{CrO}_2\text{Cl}_2 \quad \text{SnCl}_2/\text{HCl}
4. \text{CrO}_2\text{Cl}_2 \quad \text{PCC}

What are X and Y in the following reactions?

\[ X \xrightarrow{i) \text{LiAlH}_4, \text{H}_2\text{O}} \text{RCH}_2\text{NH}_2 \xrightarrow{\text{H}_2/\text{Ni}} Y \]

Options:
1. \text{RCOONH}_4 \quad \text{RCNH}_2\text{CN}
2. \text{RCN} \quad \text{RCO\text{NH}_2}
3. \text{RNHCH}_3 \quad \text{RCH}_2\text{NC}
4. \text{RCO\text{NH}_2} \quad \text{RCN}
The order of basic strength of methyl substituted amines and NH₃ in aqueous solution is

Options:

1. (CH₃)₂NH > CH₃NH₂ > (CH₃)₃N > NH₃

2. (CH₃)₃N > (CH₃)₂NH > CH₃NH₂ > NH₃

3. (CH₃)₂NH > CH₃NH₂ > NH₃ > (CH₃)₃N

4. NH₃ > CH₃NH₂ > (CH₃)₂NH > (CH₃)₃N