Question Number : 1  Question Id : 1017174321  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \([\lfloor \cdot \rfloor]\) denotes the greatest integer function and if \(f : (5, 10) \rightarrow (7, 12)\) is a function defined by \(f(x) = x + 2\left[\frac{x}{5}\right]\), then

\([\lfloor \cdot \rfloor]\) ప్రపంచ సంఖ్యలు సూచించిన చక్రవర్తి, \(f : (5, 10) \rightarrow (7, 12)\) ఫంక్షను, \(f(x) = x + 2\left[\frac{x}{5}\right]\)

Options :
1. \(f^{-1}(x) = x - 1\)
2. \(f^{-1}(x) = x + 2\)
3. \(f^{-1}(x) = x - 2\)
4. \(f^{-1}(x)\) does not exist

Question Number : 2  Question Id : 1017174322  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \([\lfloor \cdot \rfloor]\) denotes the greatest integer function, then the domain and range of the function
\[
f(x) = \frac{\sin[x] \pi + \tan[x] \pi}{1 + [x]^2 + [x]^4}
\]
are respectively

\[ f(x) = \frac{\sin[x] \pi + \tan[x] \pi}{1 + [x]^2 + [x]^4} \]

Options:
1. \(\mathbb{R} \setminus \{0\}, \mathbb{R} \setminus \{0\}\)
2. \(\mathbb{R}^+, \{0\}\)
3. \(\mathbb{R}^+, \mathbb{R}\)
4. \(\mathbb{R}, \{0\}\)

Question Number: 3  Question Id: 1017174323  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The least positive integer greater than 1 that divides \(49^n + 16n - 1\) for all positive integers \(n\) is

Options:
1. 64
2. 49
3. 7
4. 2

Question Number: 4  Question Id: 1017174324  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

If \(A\) is a matrix of order 3 whose determinant is equal to 6, then \(\det(\text{adj} \ A) = \)

If \(A\) is a matrix of order 3 whose determinant is equal to 6, then \(\det(\text{adj} \ A) = \]

Options:
1. 6
2. 36
3. 216
If $A$ and $B$ are square matrices of order 3, then $\left|\left(A - A^T\right) + \left(B - B^T\right)\right| =$

Options:
1. $2|A|$
2. $2|B|$
3. $2(|A| + |B|)$
4. 0

The system of equations $x + y + z = 5$, $x + 2y + 3z = 9$ and $x + 3y + \lambda z = \mu$ has unique solution if

Options:
1. $\lambda = 5$, $\mu = 10$
2. $\lambda = 5$, $\mu \neq 10$
3. $\lambda \in \mathbb{R}$, $\mu \neq 5$
4. $\lambda = 5$, $\mu \in \mathbb{R}$

If $a$ and $c$ are complex numbers and $b$ is a real number in the Argand plane, then the perpendicular distance from $c$ to the line $a\overline{z} + \overline{a}z + b = 0$ is

Options:
1. $\frac{2|a|}{(a\overline{c} + \overline{a}c + b)}$
1. \[ \frac{a \overline{c} + ac + b}{2 |a|} \]
2. \[ \frac{a \overline{c} + \overline{a} c + b}{|a|} \]
3. \[ \frac{a + b + \overline{c}}{2 |a|} \]

Question Number: 8  Question Id: 1017174328  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The real part of the complex number \( z = \frac{5 + 2i}{2 - 5i} - \frac{3 - 4i}{4 + 3i} - \frac{1}{i} \), is

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

Question Number: 9  Question Id: 1017174329  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

If \( z \), \( iz \) and \( z + iz \) are the vertices of a triangle and if \( |z| = 4 \), then the area (in sq. units) of that triangle, is

\[ |z| = 4 \text{  (దిశాప్రస్థాపక విశేషాలు)} \]

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

Question Number: 10  Question Id: 1017174330  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

\[ \sum_{n=1}^{20} \left[ \sin \left( \frac{2n\pi}{21} \right) - i \cos \left( \frac{2n\pi}{21} \right) \right] = \]
The integral value of \( k \) for which \( x^2 - 2(4k-1)x + 15k^2 - 2k - 7 > 0 \) for all \( x \in \mathbb{R} \) is

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

If \( x_1, x_3 \) are the roots of \( Ax^2 - 4x + 1 = 0 \) and \( x_2, x_4 \) are the roots of \( Bx^2 - 6x + 1 = 0 \) such that \( x_1, x_2, x_3, x_4 \) are in harmonic progression, then \( \frac{B+A}{B-A} = \)

\[
\frac{B + A}{B - A} = \]

Options:
1. \( \frac{11}{5} \)
2. \( -\frac{11}{5} \)
3. \( \frac{5}{11} \)
Question Number : 13  Question Id : 1017174333  Display Question Number : Yes  Single Line Question Option : No  Option
Orientation : Vertical

If \( \alpha \) and \( \beta \) are the roots of \( ax^2 + bx + c = 0 \), then the roots of \( ax^2 - bx(x - 1) + c(x - 1)^2 = 0 \) are

\[ \alpha, \beta \text{ or } \frac{ax^2 + bx + c = 0}{\alpha + 1}, \frac{ax^2 - bx(x - 1) + c(x - 1)^2 = 0}{\beta + 1} \]

Options :

1. \( \frac{\alpha + 1}{\alpha}, \frac{\beta + 1}{\beta} \)
2. \( \frac{\alpha}{\beta}, \frac{\beta + 1}{\alpha + 1} \)
3. \( \frac{\alpha}{\beta}, \frac{\beta}{\alpha} \)
4. \( \frac{\alpha - 1}{\alpha + 1}, \frac{\beta - 1}{\beta + 1} \)

Question Number : 14  Question Id : 1017174334  Display Question Number : Yes  Single Line Question Option : No  Option
Orientation : Vertical

If the roots of the equation \( x^5 - 40x^4 - Px^3 - Rx - S = 0 \) are in geometric progression and the sum of the reciprocals of the roots is 10, then \(|S| = \)

\[ x^5 - 40x^4 - Px^3 - Rx - S = 0 \]

Options :

1. 8
2. 16
3. 32
4. 64

Question Number : 15  Question Id : 1017174335  Display Question Number : Yes  Single Line Question Option : No  Option
Orientation : Vertical
The number of all four digit numbers which do not have four distinct digits is

Options :
1. 4464
2. 4848
3. 4355
4. 4454

The number of ways of arranging the letters of the word BANANA so that the two Ns do not come together, is

Options :
1. 60
2. 80
3. 40
4. 120

The coefficient of $x^{10}$ in the expansion of $\left(1 + x^2 - x^3\right)^8$ is

\[
\left(1 + x^2 - x^3\right)^8 \quad \text{contains} \quad x^{10} \quad \text{term}
\]

Options :
1. 506
2. 496
3. 486
4. 476
If \((1 + x + x^2)^n = a_0 + a_1x + a_2x^2 + \ldots + a_{2n}x^{2n}\), then \(a_0 + a_2 + a_4 + \ldots + a_{2n} = \)

\[
\left(1 + x + x^2\right)^n = a_0 + a_1x + a_2x^2 + \ldots + a_{2n}x^{2n}
\]

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

**Question Number:** 19  **Question Id:** 1017174339  **Display Question Number:** Yes  **Single Line Question Option:** No  **Option Orientation:** Vertical

The values of \(x\) for which \(\frac{x}{(x-1)^2(x-2)}\) has an expansion and the coefficient of \(x^n\) in such expansion are respectively

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

**Options:**
1. \(|x| < 1, 1 - n - \frac{1}{2^n}\)
2. \(|x| < 2, 1 - n - \frac{1}{2^n}\)
3. \(|x| < 1, 0\)
4. \(x \in \mathbb{R}, 1 - n - \frac{1}{2^n}\)

**Question Number:** 20  **Question Id:** 1017174340  **Display Question Number:** Yes  **Single Line Question Option:** No  **Option Orientation:** Vertical

The value of \(\cot 70^\circ + 4 \cos 70^\circ\) is

\[
\cot 70^\circ + 4 \cos 70^\circ
\]

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

**Question Number : 21**  
**Question Id : 1017174341**  
**Display Question Number : Yes**  
**Single Line Question Option : No**  
**Orientation : Vertical**

\[ \frac{\sqrt{2} - \sin \alpha - \cos \alpha}{\sin \alpha - \cos \alpha} \]

**Options :**

1. \( \sec \left( \frac{\alpha - \pi}{2} \right) \)
2. \( \cos \left( \frac{\pi - \alpha}{8} \right) \)
3. \( \tan \left( \frac{\alpha - \pi}{2} \right) \)
4. \( \cot \left( \frac{\alpha - \pi}{2} \right) \)

**Question Number : 22**  
**Question Id : 1017174342**  
**Display Question Number : Yes**  
**Single Line Question Option : No**  
**Orientation : Vertical**

If \( \sin (x + 3\alpha) + 3 \sin(x - \alpha) = 0 \), then

\[ \sin (x + 3\alpha) + 3 \sin(x - \alpha) = 0 \]

**Options :**

1. \( \tan x = \tan \alpha \)
2. \( \tan x = \tan^2 \alpha \)
3. \( \tan x = \tan^3 \alpha \)
4. \( \tan x = 3 \tan \alpha \)

**Question Number : 23**  
**Question Id : 1017174343**  
**Display Question Number : Yes**  
**Single Line Question Option : No**  
**Orientation : Vertical**
If \( \cot \frac{x}{2} - \csc \frac{x}{2} = \cot x \), then the values of \( x \) are

\[
\cot \frac{x}{2} - \csc \frac{x}{2} = \cot x
\]

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

Question Number: 24 Question Id: 1017174344 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

The number of solutions of the equation \( 2\cos^{-1}x + \sin^{-1}x = \frac{11\pi}{6} \) is

\[
2\cos^{-1}x + \sin^{-1}x = \frac{11\pi}{6}
\]

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

Question Number: 25 Question Id: 1017174345 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

If \( \sinh^{-1}(2) + \sinh^{-1}(3) = \alpha \), then \( \sinh \alpha = \)

\[
\sinh^{-1}(2) + \sinh^{-1}(3) = \alpha
\]

Options:
1. \( 2\sqrt{5} + 3\sqrt{10} \)
2. \( 3\sqrt{10} + 3\sqrt{5} \)
3. \( 2\sqrt{10} + 2\sqrt{5} \)
4. \( 2\sqrt{10} + 3\sqrt{5} \)
In \( \Delta ABC \) if \( a = 2b \) and \( |A - B| = \frac{\pi}{3} \), then \( \angle C = \) 

\[ \Delta ABC \Rightarrow a = 2b, \quad \text{and} \quad |A - B| = \frac{\pi}{3}, \quad \angle C = \]

Options:
1. \( \frac{\pi}{12} \)
2. \( \frac{\pi}{6} \)
3. \( \frac{\pi}{3} \)
4. \( \frac{\pi}{2} \)

The base of a triangle is 80 and one of the base angles is 60°. If the sum of the lengths of the other two sides is 90, then the shortest side is of length 

\[ \text{ఏంధ్యం వాటి వింతలు అధికంగా ఉండాలను, ఒకటి ప్రధాన కోణం 60°. మరియు కూడా అన్న రెండు కోణాలు ఉంటాయి, తోండి తేడా వశాని ఉంది.} \]

Options:
1. 15
2. 21
3. 19
4. 17

In \( \Delta ABC \). if \( r_1 = 3, \ r_2 = 10 \) and \( r_3 = 15 \), then \( R = \) 

\[ \Delta ABC \Rightarrow r_1 = 3, \ r_2 = 10, \ r_3 = 15 \quad \text{మూడు వశానిలో,} \quad R = \]

Options:
1. 5
2. 12
Question Number : 29  Question Id : 1017174349  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \vec{a}, \vec{b} \) are two non-parallel unit vectors and the vector \( \alpha \vec{a} + \vec{b} \) bisects the internal angle between \( \vec{a} \) and \( \vec{b} \), then \( \alpha \) is equal to

\[ \vec{a}, \vec{b} \text{ యొక్క నిష్పత్తి సంఖ్యలు కలిగి ఉంటాయి గిరుతో గిరుతోముంతో విభాగం అయితే \alpha \vec{a} + \vec{b} \text{ డిశ్యూస్ ఉంది కనే, అతిని అ అమర్చే} \]

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

---

Question Number : 30  Question Id : 1017174350  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \overrightarrow{OA} = 3\vec{i} + \vec{j} - \vec{k} \), \( |\overrightarrow{AB}| = 2\sqrt{6} \) and the direction ratios of \( \overrightarrow{AB} \) are 1, -1, 2 then \( |\overrightarrow{OB}| = \)

\[ \overrightarrow{OA} = 3\vec{i} + \vec{j} - \vec{k}, |\overrightarrow{AB}| = 2\sqrt{6} \text{ ఏ భాగం పనులు అయితే \overrightarrow{AB} విద్యుత్ అయితే 1, -1, 2 అయితే, } |\overrightarrow{OB}| = \]

Options :
1. \( \sqrt{41} \)
2. \( \sqrt{35} \)
3. \( \sqrt{26} \)
4. \( \sqrt{55} \)

---

Question Number : 31  Question Id : 1017174351  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let \( \vec{a}, \vec{b}, \vec{c} \) be three vectors such that \( |\vec{a}| = |\vec{c}| = 1, |\vec{b}| = 4, |\vec{b} \times \vec{c}| = \sqrt{15} \). If \( \lambda\vec{a} = \vec{b} - 2\vec{c} \), then the value of \( \lambda \) is

\[ |\vec{a}| = |\vec{c}| = 1, |\vec{b}| = 4, |\vec{b} \times \vec{c}| = \sqrt{15} \text{ ఏ భాగం పనులు అయితే \vec{a}, \vec{b}, \vec{c} అయితే అయితే, } \lambda\vec{a} = \vec{b} - 2\vec{c} \text{ అయితే, } \lambda \text{ మిగిలించే} \]

Options :
Let \( \vec{u}, \vec{v}, \vec{w} \) be vectors such that \(|\vec{u}|=1,|\vec{v}|=2,|\vec{w}|=3\). If the projection of \( \vec{v} \) on \( \vec{u} \) is equal to that of \( \vec{w} \) on \( \vec{u} \), and the vectors \( \vec{v}, \vec{w} \) are perpendicular to each other, then \(|\vec{u} - \vec{v} + \vec{w}| = \)

\[
\begin{align*}
|\vec{u}| &= 1, |\vec{v}| = 2, |\vec{w}| = 3 \\
\text{Since the projection of } \vec{v} \text{ on } \vec{u} &= \text{ the same as the projection of } \vec{w} \text{ on } \vec{u}, \text{ then } \vec{u} \parallel \vec{w} \\
\vec{u} \parallel \vec{w} \text{ implies that } \vec{v} \perp \vec{w} \text{ and } \vec{v} \perp \vec{u} \text{ as well}, \text{ hence } |\vec{u} - \vec{v} + \vec{w}| = \end{align*}
\]

Options:
1. 2
2. \(\sqrt{7}\)
3. \(\sqrt{14}\)
4. 14

If the vectors \( \vec{a}, \vec{b}, \vec{c} \) satisfy the condition \(|\vec{a} - \vec{c}| = |\vec{b} - \vec{c}| \) \text{, then } \((\vec{b} - \vec{a}) \cdot \left(\vec{c} - \frac{\vec{a} + \vec{b}}{2}\right) = \)

\[
\begin{align*}
\vec{a}, \vec{b}, \vec{c} \text{ satisfy } |\vec{a} - \vec{c}| = |\vec{b} - \vec{c}| \text{ is } \vec{a} \parallel \vec{b} \text{ as well, } \text{ hence } (\vec{b} - \vec{a}) \cdot \left(\vec{c} - \frac{\vec{a} + \vec{b}}{2}\right) = \end{align*}
\]

Options:
1. 0
2. -1
3. 1
4. 2
For two given vectors \( \vec{a} \) and \( \vec{b} \) if the vectors \( \vec{A}, \vec{B} \) are such that \( \vec{A} + \vec{B} = \vec{a}, \vec{A} \times \vec{B} = \vec{b} \) and \( \vec{A} \cdot \vec{a} = 1 \), then \( \vec{A} = \) 

Options:

\[
\frac{(\vec{a} \times \vec{b}) + \vec{a}}{\vec{a}^2}
\]

1. \[
\frac{\vec{b} \times \vec{a} + \vec{a} (\vec{a}^2 - 1)}{\vec{a}^2}
\]

2. \[
\frac{\vec{a} (\vec{a}^2 - 1) + \vec{b} (\vec{b}^2 - 1)}{\vec{a}^2 + \vec{b}^2}
\]

3. \[
\frac{(\vec{a} \times \vec{b}) + \vec{b}}{\vec{b}^2}
\]

The mean of numbers \( a, b, 8, 5, 10 \) is 6 and their variance is 6.80. Then \( \tan^{-1} \left( \frac{1}{a} \right) + \tan^{-1} \left( \frac{1}{b} \right) = \) 

\( a, b, 8, 5, 10 \) యొక్క సంఖ్యలు, ఆధారంగా 6 ఉంది మరియు వేర్పాద విభాగం 6.80 ఉంది, తోభితా పరిసరాలు \( \tan^{-1} \left( \frac{1}{a} \right) + \tan^{-1} \left( \frac{1}{b} \right) = \) 

Options:

1. \( \tan^{-1} \left( \frac{7}{12} \right) \)

2. \( \tan^{-1} \left( \frac{7}{11} \right) \)

3. \( \tan^{-1} \left( \frac{11}{7} \right) \)

4. \( \tan^{-1} \left( \frac{7}{11} \right) \)
If the coefficients of variation of two distributions are 60 and 70 and their standard deviations are 21 and 16 respectively, then their arithmetic means are respectively

Options:
1. 35, 22.85
2. 32, 25.85
3. 35, 28.25
4. 35, 25.25

If $E_1, E_2$ are two events of a sample space such that $P(E_1) = \frac{1}{4}, P(E_2 | E_1) = \frac{1}{2}, P(E_1 | E_2) = \frac{1}{4}$, then $P(E_1 | E_2) =$

$P(E_1) = \frac{1}{4}, P(E_2 | E_1) = \frac{1}{2}, P(E_1 | E_2) = \frac{1}{4}$

Options:
1. \(\frac{1}{3}\)
2. \(\frac{1}{4}\)
3. \(\frac{1}{2}\)
4. \(\frac{3}{4}\)
If $A$ and $B$ are any two events such that $P(A \cup B) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ and $P(A) = \frac{1}{4}$, then the events $A$ and $B$ are

$P(A \cup B) = \frac{1}{6}$, $P(A \cap B) = \frac{1}{4}$ 所以 $P(A) = \frac{1}{4}$ 亦得知道事件 $A$, $B$ 相

Options:

1. Equally likely but not independent
2. Equally likely and mutually exclusive
3. Mutually exclusive and independent
4. Independent but not equally likely

Question Number: 39  Question Id: 1017174359  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

For a random variable $X$ if $P(X = k) = \frac{(k+1)a}{3^k}$ for $k = 0, 1, 2, \ldots$ then $a = \quad \frac{(k+1)a}{3^k}$, $k = 0, 1, 2, \ldots$ 皆有解 $a =$

Options:

1. $\frac{2}{3}$
2. $\frac{4}{9}$
3. $\frac{8}{27}$
4. $\frac{16}{81}$
On an average if one out of 100 electric bulbs produced by a company is found to be defective, then the probability that there are at least two defective bulbs in a consignment of 600 bulbs, is

\[ 1 - \frac{7}{10^6} \]

Options:
1. \( 1 - 7e^{-6} \)
2. \( 1 - 6e^{-6} \)
3. \( 1 - 6e^{-1} \)
4. \( 1 - 8e^{-4} \)

If \( A = (a, 0) \) and \( B = (-a, 0) \), then the locus of a point \( P \) such that \( PA^2 - PB^2 = a^2 \) is.

\[ A = (a, 0), \quad B = (-a, 0) \]
\[ PA^2 - PB^2 = a^2 \]

Options:
1. a circle
2. an ellipse
3. an hyperbola
4. a straight line

The angle through which the coordinate axes are to be rotated to remove the \( xy \) term in the equation \( x^2 + 2xy - y^2 = 0 \) is

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

Options:
1. \( 45^\circ \)
2. \( 30^\circ \)
3. \( 60^\circ \)
4. \( 90^\circ \)
The point \( P(a, b) \) lies on the straight line \( 3x + 2y = 13 \) and the point \( Q(b, a) \) lies on the straight line \( 4x - y = 5 \). Then the equation of the line \( PQ \) is

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

Options:
1. \( x + y = 7 \)
2. \( x + y = 5 \)
3. \( x + y = 2 \)
4. \( x + y = 21 \)

If three non-zero real numbers \( a, b, c \) are in harmonic progression, then the straight lines

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

are concurrent at the point

Options:
1. \((1, -2)\)
2. \((-2, 4)\)
3. \((4, -2)\)
4. \((-2, -4)\)
The incentre of the triangle with vertices \( A(1, \sqrt{3}), B(0, 0) \) and \( C(2, 0) \) is

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

Options:
1. \( \left( 1, \frac{\sqrt{3}}{2} \right) \)
2. \( \left( \frac{2}{3}, \frac{1}{\sqrt{3}} \right) \)
3. \( \left( \frac{2}{3}, \frac{\sqrt{3}}{2} \right) \)
4. \( \left( 1, \frac{1}{\sqrt{3}} \right) \)

The distance between the lines represented by \( x^2 + 2xy + y^2 - 8mx - 8my - 9m^2 = 0 \) is

\[
x^2 + 2xy + y^2 - 8mx - 8my - 9m^2 = 0 \text{ is}
\]

Options:
1. \( 2\sqrt{5} \) m
2. 0
3. \( 5 \) m
4. \( \sqrt{2} \) m
5. \( 5\sqrt{2} \) m
If \( \frac{x^2}{a} + \frac{2xy}{h} + \frac{y^2}{b} = 0 \) represents a pair of straight lines such that the slope of one of the lines is twice the other, then \( \frac{ab}{h^2} = \)

Options:

1. \( \frac{1}{8} \)
2. \( \frac{1}{9} \)
3. \( \frac{2}{3} \)
4. \( \frac{2\sqrt{2}}{3} \)

---

The three sides of a triangle are given by \( (x^2 + 7xy + 2y^2) (y - 1) = 0 \). Then the centroid of that triangle is

Options:

1. \( \left( \frac{2}{3}, 0 \right) \)
2. \( \left( \frac{7}{3}, \frac{2}{3} \right) \)
3. \( \left( \frac{-7}{3}, \frac{2}{3} \right) \)
4. \( \left( \frac{2}{3}, 0 \right) \)
4. \( \left( \frac{1}{3}, \frac{1}{3} \right) \)

Question Number : 49  Question Id : 1017174369  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let \( \alpha, \beta \) be the roots of \( x^2 + 5x + 6 = 0 \) and \( \gamma, \delta \) be the roots of \( y^2 + 6y + 7 = 0 \). Then the equation of the circle with \( (\alpha, \gamma) \) and \( (\beta, \delta) \) as the extremities of a diameter is

\[
x^2 + 5x + 6 = 0 \quad \text{and} \quad y^2 + 6y + 7 = 0
\]

Options :  
1. \( x^2 + y^2 + 5x + 6y + 10 = 0 \)  
2. \( x^2 + y^2 + 5x + 6y + 11 = 0 \)  
3. \( x^2 + y^2 + 5x + 6y + 13 = 0 \)  
4. \( x^2 + y^2 + 5x + 6y + 12 = 0 \)

Question Number : 50  Question Id : 1017174370  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( A(2, c) \) and \( B(d, 2) \) are two points such that the polar of one point with respect to the circle \( x^2 + y^2 = 16 \) passes through the other, then \( c + d = \)

\[
x^2 + y^2 = 16 \quad \text{and} \quad A(2, c) \quad \text{and} \quad B(d, 2)
\]

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

Question Number : 51  Question Id : 1017174371  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The number of common tangents to the circles \( x^2 + y^2 + 2x + 8y - 23 = 0 \) and \( x^2 + y^2 - 4x - 10y + 19 = 0 \), is

\[
x^2 + y^2 + 2x + 8y - 23 = 0, \quad x^2 + y^2 - 4x - 10y + 19 = 0
\]

Options :  
1. 1
If the circles \( x^2 + y^2 + 2hx + 2ky = 0 \) and \( x^2 + y^2 + 2h'x + 2k'y = 0 \) touch each other, then
\[
\frac{h'k}{hk'} =
\]

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

If the circles \( x^2 + y^2 + kx + 4y + 2 = 0 \) and \( 2(x^2 + y^2) - 4x - 3y + k = 0 \) cut orthogonally, then \( k = \)
\[
\]

Options:
1. \(-10\)
2. 3
3. \(10\)
4. \(5\)

If the circles \( x^2 + y^2 + kx + 4y + 2 = 0 \) and \( 2(x^2 + y^2) - 4x - 3y + k = 0 \) cut orthogonally, then \( k = \)
\[
\]

Options:
1. \(-5\)
2. 3
3. \(-5\)
4. 3
The equation of the circle passing through the points of intersection of the circles \( x^2 + y^2 - 2px = 0 \) and \( x^2 + y^2 - 2qy = 0 \) and having its centre on \( \frac{x}{p} - \frac{y}{q} = 2 \), is

\[
\frac{x}{p} - \frac{y}{q} = 2 \quad \text{(circle equation)}
\]

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

Question Number: 55  Question Id: 1017174375  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

If the normal at the point \( t_1 \) (i.e., at \( (at_1^2, 2at_1) \)) on \( y^2 = 4ax \) meets the parabola again at the point \( t_2 \), then \( t_1 t_2 = \)

\[
y^2 = 4ax \quad t_1 \text{ and } t_2 \text{ (normal points)}
\]

Options:
1. \( -2 - t_1^2 \)
2. \( -2 \)
3. \( -t_1^2 + 2 \)
4. \( t_1^2 + 2 \)

Question Number: 56  Question Id: 1017174376  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The equation of the common tangent to the parabolas \( y^2 = 32x \) and \( x^2 = 256y \) is

\[
y^2 = 32x \quad x^2 = 256y \quad \text{common tangent equation}
\]

Options:
1. \( x + 2y - 32 = 0 \)
2. \( x + 2y + 32 = 0 \)
3. \( 2x + y - 32 = 0 \)
4. \(2x + y + 32 = 0\)

The equation \(\frac{x^2}{2-r} + \frac{y^2}{r-5} + 1 = 0\) represents an ellipse if

\[\frac{x^2}{2-r} + \frac{y^2}{r-5} + 1 = 0\]

Options:
1. \(r > 2\)
2. \(r > 5\)
3. \(2 < r < 5\)
4. \(r < 2 \text{ or } r > 5\)

Question Number : 58  Question Id : 1017174378  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation of the locus of the foot of the perpendicular drawn from the centre of the ellipse \(\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1\) to any tangent of the ellipse is

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

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

Question Number : 59  Question Id : 1017174379  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The product of the perpendicular distances drawn from any point on the hyperbola \( \frac{x^2}{9} - \frac{y^2}{4} = 1 \) to its asymptotes is

Options:
1. 13
2. 36
3. 13
4. 5

Question Number: 60  Question Id: 1017174380  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The points \((2, 3, 5), (-1, 5,-1)\) and \((4, -3, 2)\) form

\((2, 3, 5), (-1, 5,-1)\) మరియు  \((4, -3, 2)\) వంటించే రెండు విఛేత్తులు ఉన్నాయి

Options:
1. an isosceles but not a right angled triangle
2. an isosceles right angled triangle
3. an equilateral triangle

Question Number: 61  Question Id: 1017174381  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
If the direction cosines \( l, m, n \) of two lines are satisfying the relations \( l + m + n = 0, \quad lm = 0 \), then the angle between those two lines is

\[\tan^{-1} \left( \frac{l}{m} \right) \quad \text{or} \quad \tan^{-1} \left( \frac{m}{n} \right) \quad \text{or} \quad \tan^{-1} \left( \frac{n}{l} \right) \]

Options:
1. 0
2. \( \frac{\pi}{2} \)
3. 2
4. \( \frac{\pi}{4} \)
5. 3

Question Number: 62 Question Id: 1017174382 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

If (2, -3, 6) is the foot of the perpendicular drawn from the origin to a plane, then the equation of that plane is

\[2x + 4y - 3z - 29 = 0\]

Options:
1. \(2x + 4y - 3z - 29 = 0\)
2. \(2x - 5y + 8z + 98 = 0\)
3. \(2x + 4y + 3z + 29 = 0\)
4. \(2x - 3y + 6z - 49 = 0\)

Question Number: 63 Question Id: 1017174383 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

If \( f \) is defined by 

\[f(x) = \begin{cases} \frac{1 - \cos ax}{x \sin x}, & (x \neq 0) \\ \frac{1}{2}, & (x = 0) \end{cases}\]

and \( f \) is continuous at \( x = 0 \), then \( a^2 = \)

\[f(x) = \begin{cases} \frac{1 - \cos ax}{x \sin x}, & (x \neq 0) \\ \frac{1}{2}, & (x = 0) \end{cases}\]

\[\text{ఉపఖుండి} \quad x = 0 \text{ లో అల్పందుండాయి, అంటే} \quad a^2 = \]
Question Number : 64  Question Id : 1017174384  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( f(9) = 9 \) and \( f'(9) = 4 \), then \( \lim_{x \to 9} \frac{\sqrt{f(x)} - 3}{\sqrt{x} - 3} = \)

\[ f(9) = 9 \quad \text{and} \quad f'(9) = 4 \quad \text{so that} \quad \lim_{x \to 9} \frac{\sqrt{f(x)} - 3}{\sqrt{x} - 3} = \]

Options :
1. 2
2. 3
3. 9
4. 4

Question Number : 65  Question Id : 1017174385  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The points at which the function \( f(x) = |x - 0.5| + |x - 1| + \tan x \) does not have a derivative in the interval \((0, 2)\) is

\[ f(x) = |x - 0.5| + |x - 1| + \tan x \quad \text{in the interval} \quad (0, 2) \]

Options :
1. 0.5, 1, 2
2. 0.5, \( \frac{\pi}{2} \), 0
3. 1, \( \frac{\pi}{2} \), 2
4. 0.5, 1, \( \frac{\pi}{2} \)

Question Number : 66  Question Id : 1017174386  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \( y = \tan^{-1}\left( \frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right) \) for \( 0 < |x| < 1 \), then \( \frac{dy}{dx} = \)

\[ 0 < |x| < 1 \Rightarrow y = \tan^{-1}\left( \frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right) \]
\[ \frac{dy}{dx} = \]

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

Question Number: 67  Question Id: 1017174387  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

If \( y = t^2 + t^3 \) and \( x = t - t^4 \), then the value of \( \frac{d^2y}{dx^2} \) at \( t = 1 \) is equal to

\[ y = t^2 + t^3 \quad \text{and} \quad x = t - t^4 \]
\[ t = 1 \quad \Rightarrow \quad \frac{d^2y}{dx^2} = \]

Options:
1. \( \frac{2}{3} \)
2. \( -2 \)
3. \( \frac{4}{3} \)
4. \( -\frac{4}{3} \)
If the normal to the curve \( \frac{x^2}{3} + \frac{y^2}{3} = a^\frac{2}{3} \) makes an angle \( \phi \) with the X-axis, then the equation of that normal is

\[ \frac{x^2}{3} + \frac{y^2}{3} = a^\frac{2}{3} \quad \text{in} \] Vaidyala Bhavan, Ongole, Andhra Pradesh, India, \( \text{At} \) Vaidyala Bhavan, Ongole, Andhra Pradesh, India,

Options:
1. \( y - a \cos^2 \phi = x \tan \phi - a^2 \sin^2 \phi \)
2. \( y \cos \phi - x \sin \phi = a \cos 2\phi \)
3. \( y \cos \phi - x \sin \phi = a \cos^2 \phi \)
4. \( y + a \sin^2 \phi = x \cos \phi - a \sin 2\phi \)

Question Number : 69  Question Id : 1017174389  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the rate of change of \( x \) is more than the rate of change of \( y \) on the curve \( x^3 = 12y \), \( (x > 0) \) then \( x \) lies in the interval

\[ x^3 = 12y, \quad (x > 0) \quad \text{in} \] Vaidyala Bhavan, Ongole, Andhra Pradesh, India, \( \text{At} \) Vaidyala Bhavan, Ongole, Andhra Pradesh, India,

Options:
1. \( (-2, 0) \cup (0, 2) \)
2. \( (-2, 2) \)
3. \( [-3, 3] \)
4. \( (0, 2) \)

Question Number : 70  Question Id : 1017174390  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( 0 < x < \frac{\pi}{2} \) then the maximum area (in sq. units) of the triangle whose vertices are \( (0, 0) \), \( (x, \cos x) \) and \( (\sin^3 x, 0) \) is

\[ 0 < x < \frac{\pi}{2} \quad \text{in} \] Vaidyala Bhavan, Ongole, Andhra Pradesh, India, \( \text{At} \) Vaidyala Bhavan, Ongole, Andhra Pradesh, India,

Options:
Suppose $f(x)$ is twice differentiable in the interval $[1, 3]$ and $f'(1) = f(3)$. If $|f''(x)| \leq 2$, then for all $x$ in $[1, 3]$, which one of the following is true?

\[ [1, 3] \text{ 中 } f'(x) \text{ 连续可导且 } f'(1) = f(3) \text{ 则必有 } |f''(x)| \leq 2 \]

Options:
1. $|f'(x)| \geq 1$
2. $-4 < f'(x) < 4$
3. $|f'(x)| > 2$
4. $-3 \leq f'(x) \leq 3$

If $0 < a < 1$, then

\[ \int \frac{dx}{1 - 2a \cos x + a^2} = \]

$0 < a < 1$ 时，有

\[ \int \frac{dx}{1 - 2a \cos x + a^2} = \]

Options:
1. $\frac{1}{1-a^2} \tan^{-1} \left[ \frac{1+a}{1-a} \tan \left( \frac{x}{2} \right) \right] + c$
2. $\frac{2}{1+a^2} \tan^{-1} \left[ \frac{1-a}{1+a} \tan \left( \frac{x}{2} \right) \right] + c$
\[
\frac{2}{1-a^2} \tan^{-1} \left[ \frac{1+a}{1-a} \tan \frac{x}{2} \right] + c
\]

\[
\frac{2}{1+a} \tan^{-1} \left[ \frac{1-a^2}{1+a^2} \tan \frac{x}{2} \right] + c
\]

3. If \( \int \sin^5 x \, dx = \frac{-\cos^5 x}{5} + a \cos^3 x + b \cos x + c \), then \( a + b = \)

\[
\int \sin^5 x \, dx = \frac{-\cos^5 x}{5} + a \cos^3 x + b \cos x + c
\]

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

4. \( \int \frac{6x+5}{\sqrt{6+x-2x^2}} \, dx = \)

Options:
1. \(-3\sqrt{6+x-2x^2} + \frac{13}{2\sqrt{2}} \sin^{-1} \left( \frac{4x-1}{7} \right) + c\)
2. \(-3\sqrt{6+x-2x^2} + \frac{13}{\sqrt{2}} \sinh^{-1} \left( \frac{4x-1}{7} \right) + c\)
3. \(-3\sqrt{6+x-2x^2} + \frac{13}{2\sqrt{3}} \sinh^{-1} \left( \frac{4x+1}{7} \right) + c\)
4. \(3\sqrt{6+x-2x^2} - \frac{13}{2\sqrt{2}} \cos^{-1} \left( \frac{4x-1}{7} \right) + c\)
\[ \int_{-1}^{1/2} x \sin \pi x \, dx = \]

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

---

Question Number : 76 Question Id : 1017174396 Display Question Number : Yes Single Line Question Option : No Option
Orientation : Vertical

By the definition of the definite integral, the value of

\[ \lim_{n \to \infty} \left[ \frac{1^2}{1^3 + n^3} + \frac{2^2}{2^3 + n^3} + \ldots + \frac{r^2}{r^3 + n^3} + \ldots + \frac{1}{2n} \right] = \]

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

---

Question Number : 77 Question Id : 1017174397 Display Question Number : Yes Single Line Question Option : No Option
Orientation : Vertical

\[ \lim_{n \to \infty} \left[ \frac{1^2}{1^3 + n^3} + \frac{2^2}{2^3 + n^3} + \ldots + \frac{r^2}{r^3 + n^3} + \ldots + \frac{1}{2n} \right] = \]

Options:
1. \( \frac{4}{\sqrt{\log 2}} \)
2. \( \log \frac{3}{2} \)
3. \( \sqrt{\log 2} \)
4. \( \log \frac{3}{3} \)
The area of the region that is common to the circle \( x^2 + y^2 = 16a^2 \) and the parabola \( y^2 = 6ax \) is

\[ x^2 + y^2 = 16a^2 \text{ and } y^2 = 6ax \text{ are } \text{conics} \text{ respectively} \]

Options:

1. \[ \frac{4a^2}{3} \left( 4\pi + \sqrt{3} \right) \]
2. \[ \frac{2a^2}{3} \left( 3\pi + \sqrt{3} \right) \]
3. \[ \frac{4a^2}{3} \left( 2\pi + \sqrt{2} \right) \]
4. \[ \frac{2a^2}{3} \left( 2\pi + \sqrt{3} \right) \]

**Question Number : 78**  Question Id : 1017174398  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int_0^\pi x \sin^7 x \cos^6 x \, dx = \]

Options:

1. \( 8\pi \)
2. \( 1002 \)
3. \( 18\pi \)
4. \( 1003 \)
5. \( 16\pi \)
6. \( 3003 \)
7. \( 6\pi \)
8. \( 3003 \)

**Question Number : 79**  Question Id : 1017174399  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The general solution of the differential equation \( (x - y)^2 \frac{dy}{dx} = a^2 \) is

\[ (x - y)^2 \frac{dy}{dx} = a^2 \]

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

\[ x = 1 \text{  and  } y = 2 \]

Options:

1. \( y = \frac{x}{1+\sqrt{x}} \)
2. \( y = \frac{2x}{2-\sqrt{x}} \)
3. \( y = \frac{x}{2(1+\sqrt{x})} \)
4. \( y = \frac{2x}{1+\sqrt{x}} \)

Display Number Panel: Yes
Group All Questions: No
The radius \( r \) of a wire is given by \( r = \sqrt{\frac{64IA}{\pi BV}} \), where \( I \) is electric current, \( B \) is magnetic field and \( v \) is velocity. Then the parameter \( A \) in the formula represents _________.

Options:
1. Resistance
2. Resistivity
3. Capacitance
4. Conductivity

Question Number : 82  Question Id : 1017174402  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A stone is dropped from the top of a tall building and after 2 seconds another stone is thrown vertically downwards with a velocity 5 ms\(^{-1}\) from the same point. Then the distance from the top of the building at which second stone overtakes the first is ___ (g = 10 ms\(^{-2}\))

Options:
1. 0.222 m
2. 2.22 m
3. 22.2 m
4. 222 m

Question Number : 83  Question Id : 1017174403  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A body is projected with a velocity \((\mathbf{i} + 2\mathbf{j})\) ms\(^{-1}\), where \(\mathbf{j}\) is along the horizontal and \(\mathbf{j}\) is vertically upward. Then the equation of its trajectory is \((g = 10 \text{ ms}^{-2})\)

Options:
1. \(y = x - 5x^2\)
2. \(y = 2x - 5x^2\)
3. \(y = 2x + 5x^2\)
4. \(y = x + 5x^2\)

Question Number: 84  Question Id: 1017174404  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

A projectile is thrown with a velocity of \(10\sqrt{2} \text{ ms}^{-1}\) at an angle of 45° with the horizontal. The time interval between the moments when the speeds are \(\sqrt{125} \text{ ms}^{-1}\) is \((g = 10 \text{ ms}^{-2})\)

Options:
1. 0.5 s
2. 1.5 s
3. 2 s
4. 1.0 s

Question Number: 85  Question Id: 1017174405  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Two weights 2 N and 3 N are suspended from the ends of an inextensible string passing over a fixed frictionless pulley. If the pulley is pulled up with an acceleration equal to the acceleration due to gravity, then the tension in the string is

Options:
Two cars of masses $m_1$ and $m_2$, joined back to back by a massless compressed spring are at rest on a horizontal rough road. When the compression of the spring is suddenly removed, the cars move away from each other and come to rest due to friction. If the frictional force is same on them, their stopping times are in the ratio

\[
\frac{m_1}{m_2} \cdot \frac{m_2}{m_1} = \frac{1}{1}.
\]

Options:

1. \( \frac{m_1}{m_2} \)
2. \( \frac{m_2}{m_1} \)
3. \( \sqrt{\frac{m_2}{m_1}} \)
4. \( \sqrt{\frac{m_1}{m_2}} \)
One end of a spring of force constant 150 dyne cm\(^{-1}\) is connected to a block of mass 0.2 kg kept on a rough horizontal surface of coefficient of friction 0.3. The other end of the spring is connected to a rigid support as shown in the figure and the spring is initially undeformed. The maximum velocity \(v\) that can be given to the block so that it travels only in one direction is ______\( \text{ms}^{-1}\). (Acceleration due to gravity = 10 ms\(^{-2}\))

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

Question Number : 88  Question Id : 1017174408  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Two spheres ‘A’ and ‘B’ of equal mass lie at rest at the opposite ends of a diameter of a smooth horizontal circular groove of radius ‘\(r\)’. ‘A’ moves and collides with ‘B’ after a time ‘\(t\)’. If ‘\(e\)’ is the coefficient of restitution, next collision between the spheres takes place after a time of _________.

‘\(t\)’ మరియు అది తొడగి ఉండే పరిమాణాన్ని విస్తరించడానికి గడియారి సరిమారి బయట పడుతుంది. ‘A’ మరియు ‘B’ గా వసులు నిలయం చేస్తాం. ‘A’ లేదా ‘\(t\)’ పై గా వసులు ‘B’ రెండు సైడ్వేస్తాం. ఇంటిగా కారణం ఇది ‘\(e\)’ అంటే, గా వసులు పడించే పై బాధావంతం అంటే చేస్తాం

Options:
1. 2\(t\)
2. \(e\)
A uniform square plate has a side of length $2R$. A circular piece of maximum possible area is cut and removed from one of the quadrants of the plate as shown in the figure. Shift in the centre of mass of the plate is.

Options:

1. $\frac{\pi R}{\sqrt{2}(16-\pi)}$
2. $\frac{R}{(16-\pi)}$
3. $\frac{\pi R}{\pi(16-\pi)}$
4. $\frac{R\pi}{(16-\pi)}$
A small hole is made in a circular disc of mass ‘M’ and radius ‘R’ at a distance of \( \frac{R}{4} \) from the centre. The disc is supported on a horizontal peg through this hole. The moment of inertia of the disc about the horizontal peg is

\[ I = \frac{1}{2} MR^2 \]

Options:
1. \( \frac{9MR^2}{16} \)
2. \( \frac{5MR^2}{4} \)
3. \( \frac{5MR^2}{16} \)
4. \( \frac{MR^2}{9} \)

Question Number: 91  Question Id: 1017174411  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Assertion (A): When a spring is cut into two equal parts, spring constant of each piece is twice that of the original spring.

Reason (R): Spring constant is inversely proportional to length of the spring.

Options:
(A), (R) are true : (R) is the correct explanation of (A)
(A), (R) are true : (R) is not the correct explanation of (A)
3. (A) is false, (R) is true

4. (A) చాలు, (R) చాలు

Options:
1. \(\sqrt{\frac{3G}{10}}\)
2. \(\sqrt{\frac{10G}{3}}\)
3. \(\sqrt{50G}\)
4. \(\sqrt{3G}\)

Question Number : 93  Question Id : 1017174413  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A material has a Poisson’s ratio 0.5. If a uniform rod of this material suffers a longitudinal strain of \(2\times10^{-3}\), then the percentage change in its volume is

Options:
1. 0.6
2. 0.4
3. 0.2
4. Zero

Question Number : 94 Question Id : 1017174414 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a cylinder provided with a piston, air is under pressure $P_1$ at a constant temperature $t$. A soap bubble with radius $r$ and surface tension $T$ is lying inside the cylinder. To reduce the radius of the soap bubble to half, the required air pressure inside the cylinder is

$$8P_1 + \frac{24T}{r}$$

Options :

1. $8P_1 + \frac{24T}{r}$
2. $8P_1 + \frac{3T}{r}$
3. $8P_1 + \frac{2T}{r}$
4. $8P_1 + \frac{12T}{r}$

Question Number : 95 Question Id : 1017174415 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

One end of a uniform metal rod of length 100 cm is placed in ice and the other end is placed in boiling water. A point of the rod which is at a distance of 60 cm from the ice end is maintained at a constant temperature of 325 °C. If 2 g of water is converted into steam per second, the mass of ice melted per second in steady state is

(Latent heat of steam = 6.75 times latent heat of fusion of ice)

100 cm ఉన్నతం కాసే ఆ వింతి తోమరుదు తక్కువ కాసే వింతిని తోమరుదు వింతిని విసూచిండి నంచడానికి. మాత్రమే కంటేగా నుండి కంటే 60 cm ఉన్నతం కాసే వింతి మాత్రమే నంచడానికి కంటే 325 °C తో వాతావరణ నంచడానికి. వాతావరణ తో నంచడానికి కంటే 2 g వాతావరణం నంచడానికి, మిశ్రమానికి రెండు మిశ్రమానికి (మిశ్రమానికి 6.75 తోకి)

Options :

1. 13 g
2. 4 g
If 4 kg of ice is inside a closed cubical thermocol box of side length 20 cm and wall thickness 4 cm then the mass of the ice remaining after 10 hours is nearly
(The outside temperature = 50 °C
co-efficient of thermal conductivity of thermocol = 0.01 J s⁻¹ m⁻¹ K⁻¹
Latent heat of fusion of ice = 335×10³ J kg⁻¹)

Options:
1. 3.678 kg
2. 6.378 kg
3. 2.87 kg
4. 1.87 kg

5.6 litre of helium gas at STP is adiabatically compressed to 0.7 litre. If the initial temperature of the gas is T K, work done in the process is (R is universal gas constant in SI units)

Options:
1. \( \frac{9}{8}RT \)
2. \( -\left(\frac{9}{8}RT\right) \)
3. \(-\left(\frac{4}{3}RT\right)\)

4. \(\frac{3}{4}RT\)

Question Number : 98  Question Id : 1017174418  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Match the following

List - I

i) Isothermal process

ii) Isobaric process

iii) Isochoric process

iv) Adiabatic process

List - II

a) 0

b) \(\frac{1}{\gamma - 1}[P_2V_2 - P_1V_1]\)

c) \(\mu RT \ln\left(\frac{V_2}{V_1}\right)\)

d) \(P(V_2 - V_1)\)

The correct answer is

Options:
1. i-c, ii-d, iii-a, iv-b
2. i-a, ii-d, iii-b, iv-c
3. i-c, ii-b, iii-d, iv-a
4. i-b, ii-c, iii-a, iv-d

Question Number: 99  Question Id: 1017174419  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The total random kinetic energy of 1 g of helium at 100 K will be \( (R = 8.3 \text{ J mol}^{-1} \text{ K}^{-1}) \)

\[
100 \text{ K} \quad 1 \text{ g He} \quad \text{random energy} \quad \text{mol}^{-1} \quad \text{K}^{-1} \quad \text{J} \quad (R = 8.3 \text{ J mol}^{-1} \text{ K}^{-1})
\]

Options:
1. 622.50 J
2. 311.25 J
3. 155.62 J
4. 415.00 J

Question Number: 100  Question Id: 1017174420  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

An open pipe and a closed pipe have fundamental frequencies \( n_1 \) and \( n_2 \) respectively. They are combined to form a closed pipe. Fundamental frequency of the combined pipe is

\[
\frac{n_1 + n_2}{n_1 n_2} \quad \text{or} \quad \frac{n_1 - 2n_2}{n_1 + 2n_2}
\]

Options:
1. \( n_1 + n_2 \)
2. \( n_1 - n_2 \)
3. \( \frac{n_1 n_2}{n_1} \)
4. \( n_1 + 2n_2 \)

Question Number: 101  Question Id: 1017174421  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

An open pipe and a closed pipe have fundamental frequencies \( n_1 \) and \( n_2 \) respectively. They are combined to form a closed pipe. Fundamental frequency of the combined pipe is

\[
\frac{n_1 + n_2}{n_1 n_2} \quad \text{or} \quad \frac{n_1 - 2n_2}{n_1 + 2n_2}
\]

Options:
1. \( n_1 + n_2 \)
2. \( n_1 - n_2 \)
3. \( \frac{n_1 n_2}{n_1} \)
4. \( n_1 + 2n_2 \)
A source emitting sound of frequency 288 Hz is tied to a string of 100 cm length and rotated with an angular velocity of 20 rad s⁻¹ in the horizontal plane. The range of frequencies heard by an observer standing at a distance of 5 m from the source is (in Hz)
(Speed of sound in air = 340 ms⁻¹)

288 Hz పరిమాణాలు కల్పించడం సాధనాన్ని 100 cm నిర్మాణం కల్పించడం ఉంది అంటే అది పరిమాణాలు 20 rad s⁻¹ పరిమాణాలు కల్పించడం సాధనాన్ని తొలి పరిమాణాలు విస్తరించడం. అది అది 5 m విస్తరించడం
నిర్మాణాలు పరిమాణాలు ఈ పరిమాణాలు మాత్రమే (Hz కు)

(నిర్మాణాలు పరిమాణాలు మాత్రమే = 340 ms⁻¹)

Options :
1. 275 to 320
2. 272 to 306
3. 288 to 340
4. 278 to 298

Question Number : 102 Question Id : 1017174422 Display Question Number : Yes Single Line Question Option : No Option
Orientation : Vertical
A glass prism of refracting angle 60° is immersed in a liquid in which angle of minimum deviation is 30°. The critical angle of glass with respect to the liquid medium is

ప్రస్తుతాల నుండి 60° నుండి అది లిమిట్ నిర్మాణాలు ఉండే ప్రస్తుతాల నిర్మాణాలు తొలి పరిమాణాలు మాత్రమే 30°. అది అది అది నిర్మాణాలు విస్తరించడం కు

Options :
1. 30°
2. 45°
3. 60°
4. 90°

Question Number : 103 Question Id : 1017174423 Display Question Number : Yes Single Line Question Option : No Option
Orientation : Vertical
Three polaroid sheets are kept parallel to each other such that first and last are crossed. Unpolarised light of intensity 32 \text{ Wm}^{-2} \text{ falls normally on the first sheet and passes through all the polaroid sheets. If the intensity of the emerging light from the third sheet is 3 \text{ Wm}^{-2}, then the angle between the axes of the first two polaroid sheets is}\)

Options:
1. 60°
2. 45°
3. 30°
4. 90°

Question Number: 104 Question Id: 1017174424 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

Electric field in a region is given by \( \mathbf{E} = a\mathbf{i} + b\mathbf{j} \), where \( a \) and \( b \) are constants. The net flux passing through a square area of side / parallel to y-z plane is

\[
\mathbf{E} = a\mathbf{i} + b\mathbf{j}
\]

y-z plane is // to the plane of the paper

Options:
1. \( a/2 \)
2. \( a \)
3. \( b/2 \)
4. \( b \)
The linear charge densities of two infinitely long thin and parallel wires are 4 Cm$^{-1}$, 8 Cm$^{-1}$ and separation between them is 4 cm. Then the electric field intensity at mid point on the line joining them is

Options:
1. $18 \times 10^{11}$ NC$^{-1}$
2. $36 \times 10^{11}$ NC$^{-1}$
3. $9 \times 10^{11}$ NC$^{-1}$
4. $72 \times 10^{11}$ NC$^{-1}$

Question Number: 106 Question Id: 1017174426 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

Two conducting spheres of radii 9 cm and 1 cm are separated by a distance of 20 cm in free space. If the spheres are charged to same potential of 10 V each, the force of repulsion between them is

Options:
1. $\frac{4}{9} \times 10^{-9}$ N
2. $\frac{10^{-9}}{4}$ N
3. $\frac{10^{-9}}{3}$ N
4. $4 \times 10^{-9}$ N

Question Number: 107 Question Id: 1017174427 Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical
In the diagram, the area of each plate is 2 m² and d = 2×10⁻³ m. An electric charge of 8.85×10⁻⁸ C is given to the plate ‘Q’. Then the potential of Q is

Options:
1. 13 V
2. 10 V
3. \(\frac{20}{3}\) V
4. 8.85 V

In the circuit given, the charge on the capacitor is

Options:
1. \(\frac{CER_1}{R_1 + r}\)
2. \(\frac{C}{R_1 + r}\)
The current through 2Ω resistor of the given circuit is _________ mA.

Options:
1. 960
2. 320
3. 980
4. 1960

The magnetic induction at the centre of a current carrying circular coil of radius 8 cm is \(6\sqrt{6}\) times the magnetic induction at a point on its axis. Then the distance of the point from the centre of the coil in cm is \((\sqrt{5} = 2.236)\)

Options:
1. 17.89
2. 1.789
A beam of protons moving with a velocity $1.6\times10^5$ m/s enters a uniform magnetic field of $\frac{\pi}{10}$ T at an angle $60^\circ$ to the direction of the field. The pitch of the helical path of the protons is (mass of proton = $1.6\times10^{-27}$ kg)

$$1.6\times10^5 \text{ m/s}$$

Options:
1. $1.6\times10^{-2}$ m
2. $2.6\times10^{-2}$ m
3. $0.16\times10^{-2}$ m
4. $0.016\times10^{-2}$ m

The energy dissipated per unit volume per cycle in the hysteresis of an iron sample of mass 10 kg is 200 J/m$^3$ cycle$^{-1}$. The density of iron is 7500 kg m$^{-3}$. The loss of energy per hour at 50 cycle s$^{-1}$ is

10 kg (mass) × 200 J/m$^3$ cycle$^{-1}$ 200 J/m$^3$ cycle$^{-1}$ × 7500 kg m$^{-3}$ 50 cycle s$^{-1}$

Options:
1. 24000 J
2. 48000 J
3. 96000 J
4. 12000 J
The magnetic flux linked with a closed coil is increased to a maximum value in 2 s and its relation with time is \( \phi = at^2 + bt + c \) then the relation between \( a \), \( b \) and \( c \) is

![Image of options]

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

Question Number : 114  Question Id : 1017174434  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

An LCR series circuit is connected to an external emf. \( e = 200 \sin 100 \pi t \) v. The values of capacitance and resistance in the circuit are 1 \( \mu \text{F} \) and 100 \( \Omega \) respectively. The amplitude of current in the circuit is maximum when the inductance is (in henry)

![Image of options]

**Options :**
1. \( \frac{100}{\pi^2} \)
2. 100
3. 100 \( \pi \)
4. \( 10^4 \)

Question Number : 115  Question Id : 1017174435  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
A parallel plate capacitor is completely immersed in a liquid of resistivity 0.25 \( \Omega \text{m} \) and relative permittivity 80. If the plates of the capacitor are connected to an alternating voltage source of \( V_0 \sin(\omega t) \) volt at a frequency of 0.4 GHz, then the ratio of the amplitudes of the displacement current and conduction current is 

\[
\left( \frac{1}{4\pi \varepsilon_0} \right) = 9\times10^9 \text{Nm}^2\text{C}^{-2}
\]

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

Question Number : 116  Question Id : 1017174436  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the momentum of an electron changes by ‘\( P \)’ then the de-Broglie wavelength associated with it changes by 5%. Then the initial momentum of the electron is

\[
\text{If momentum changes by} \quad \frac{\Delta P}{P} = 5% \quad \text{then} \quad P = 20 \quad \Delta P
\]

Options:
1. \( \frac{P}{20} \)
2. 20 \( P \)
3. \( \frac{P}{20} \)
4. 30 \( P \)
A stationary hydrogen atom emits a photon corresponding to first line of Lyman series. Recoil velocity of the atom is nearly

![Graph of radioactive decay](image)

Options:
1. 3.2 ms\(^{-1}\)
2. 0.63 ms\(^{-1}\)
3. 8.2 ms\(^{-1}\)
4. 0.1 ms\(^{-1}\)

The decay of a radioactive material is shown in the graph. From the graph, the decay constant of the material is nearly

Options:
1. \(1 \times 10^{-5}\) s\(^{-1}\)
2. \(0.693 \times 10^{-4}\) s\(^{-1}\)
3. \(2 \times 10^{-6}\) s\(^{-1}\)
4. \(0.5 \times 10^{-5}\) s\(^{-1}\)
In the following logic circuit, the values of $Y_1, Y_2$ and $Y_3$ are respectively

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

TV transmission antenna at a particular station has a height of 100 m. By how much the height of the antenna is to be increased to double its coverage range?

Options:
1. 41.4 m
2. 121.4 m
3. 70.7 m
4. 100 m
If the wave number of radiation emitted for the electron transition from an excited state to ground state of hydrogen is \( \frac{5x}{36} \) m\(^{-1}\), the wave number of radiation absorbed for the electron transition from the above excited state to next immediate excited state in m\(^{-1}\) is:

\[
\text{Options:} \\
1. \frac{7x}{36} \\
2. 144 \\
3. 21x \\
4. 100 \\
5. 16x \\
6. 225 \\
7. \frac{5x}{36}
\]

**Question Number:** 122  
**Question Id:** 1017174442  
**Display Question Number:** Yes  
**Single Line Question Option:** No  
**Option Orientation:** Vertical

If the de Broglie wavelength of electron is 728.14 nm, its kinetic energy in J is:  
(mass of electron = \(9.1 \times 10^{-31}\) kg; \(h = 6.626 \times 10^{-34}\) J s)

\[
\text{Options:} \\
1. 4.55 \times 10^{-25} \\
2. 9.1 \times 10^{-25} \\
3. 4.55 \times 10^{-23} \\
4. 9.1 \times 10^{-23}
\]

**Question Number:** 123  
**Question Id:** 1017174443  
**Display Question Number:** Yes  
**Single Line Question Option:** No  
**Option Orientation:** Vertical
Identify the set of elements in which they are arranged in the increasing order of electron gain enthalpies.

Options:
1. F, O, S, Cl
2. Cl, O, F, S
3. O, S, F, Cl
4. S, F, Cl, O

Assertion (A): Higher lattice enthalpy leads to greater stability of ionic compounds.
Reason (R): Lattice enthalpy is a direct measure of the electrostatic forces of repulsion among the constituent ions in an ionic solid.

The correct answer is

Options:
1. Both (A) and (R) are correct and (R) is the correct explanation of (A)
2. Both (A) and (R) are correct and (R) is not the correct explanation of (A)
3. (A) is correct, but (R) is not correct
4. (A) is not correct, but (R) is correct
The number of bond pairs, lone pairs present on the central atom of SF$_4$ molecule and its shape respectively are

SF$_4$ molecule has 4 bond pairs and 2 lone pairs on the central S atom. Therefore, the shape of SF$_4$ molecule is

Options:
1. tetrahedral
2. square planar
3. trigonal bipyramidal
4. linear

Question Number: 126  Question Id: 1017174446  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
If the RMS velocity of an ideal gas is $u$ ms$^{-1}$ at 127 °C, at what temperature its RMS velocity is doubled?

127 °C యొక్క RMS వేగం $u$ ms$^{-1}$ వేగంలో రెండు గించబడుతున్నాయి RMS వేగం ఎత్తగా ఉంటుంది?

Options:
1. 200 K
2. 160 K
3. 1600 K
4. 800 K

Question Number: 127  Question Id: 1017174447  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
Which one of the following does not undergo disproportionation reaction?

Options:
1. ClO$^-$
Question Number : 128  Question Id : 1017174448  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Molar enthalpy change for vapourisation of 1.0 mol of water at 1.0 bar and 100°C is 41.0 kJ mol⁻¹. If water vapour is assumed to be an ideal gas, the internal energy change for 1.0 g of water in kJ is

Options :
1. 1.053
2. 4.212
3. 3.159
4. 2.106

Question Number : 129  Question Id : 1017174449  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

At T(K), K_c for the reaction \( \text{SO}_2(g) + \text{NO}_2(g) \rightleftharpoons \text{SO}_3(g) + \text{NO}(g) \) is 16. If initially one mole each of all the four gases are taken in one litre vessel, the equilibrium concentrations of \( \text{SO}_3(g) \) and \( \text{SO}_2(g) \) in mol L⁻¹ respectively are:

\[ T(K) \text{ g}, \quad \text{SO}_2(\text{g}) + \text{NO}_2(\text{g}) \rightleftharpoons \text{SO}_3(\text{g}) + \text{NO}(\text{g}) \text{ such that } K_c = 16. \]

Options :
1. 1.6, 0.4
2. 0.4, 1.6
3. 0.8, 3.2
4. 3.2, 0.8

Question Number : 130  Question Id : 1017174450  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
The solubility ‘S’ of $\text{Zr}_3(\text{PO}_4)_4$ in terms of its solubility product, $K_{sp}$ is

$$K_{sp} = \text{Solubility Product of } \text{Zr}_3(\text{PO}_4)_4$$

Options:

1. $\left(\frac{K_{sp}}{144}\right)$
2. $\left(\frac{K_{sp}}{6912}\right)$
3. $\left(\frac{K_{sp}}{1728}\right)$
4. $\left(\frac{K_{sp}}{6912}\right)$

Question Number : 131 Question Id : 1017174451 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two litres of 15 volume solution of $\text{H}_2\text{O}_2$ on complete decomposition liberated $x$ litres of $\text{O}_2$ at STP. What is the value of $x$ (in litres)?

**అధికసాధనం**

$15$ వ్యాప్తి ఉండే $\text{H}_2\text{O}_2$ కాంతిని పూరుంగా వేసుకుని రావడా $x$ వ్యాప్తి $\text{O}_2$, STP భాగం ఉంచడం జరిగింది. $x$ మేధా (లిట్ర్స్) ఎంతా?

Options:

1. $15$
2. $3.0$
3. $1.5$
4. $30$

Question Number : 132 Question Id : 1017174452 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Identify the correct statement from the following.

**అధికసాధనం**

Options:
Gypsum contains a lower percentage of calcium than in Plaster of Paris

Plaster of Paris is obtained by heating Plaster of Paris

Plaster of Paris is obtained by hydration of gypsum

Plaster of Paris is obtained by partial oxidation of gypsum

The material used in nuclear industry as protective shields and control rods is

Options:
- Borax
- Metal boride
- Boric acid
- Boric oxide

Question Number : 134  Question Id : 1017174454  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Identify the correct statements among the following

a) $C_{60}$ molecule has 12 six-membered rings and 20 five-membered rings

b) $H_2CO_3/HCO_3^-$ buffer system helps to maintain pH of blood between 7.26 and 7.42

c) Graphite is used as a dry lubricant in machines running at high temperatures

Options:
1. a, b, c
2. a, b
3. b, c
4. a, c
From the following, identify the reactions which are responsible for depletion of ozone layer.

a) \[ \text{Cl} + \text{NO}_2 \rightarrow \text{ClNO}_2 \]
   \[ \text{Cl} + \text{NO}_2 \rightarrow \text{ClNO}_2 \]

b) \[ \text{CF}_2 \text{Cl}_2 \rightarrow \text{Cl} + \text{CF}_2 \text{Cl} \]
   \[ \text{CF}_2 \text{Cl}_2 \rightarrow \text{Cl} + \text{CF}_2 \text{Cl} \]

c) \[ \text{Cl} + \text{CH}_4 \rightarrow \text{HCl} + \text{CH}_3 \]
   \[ \text{Cl} + \text{CH}_4 \rightarrow \text{HCl} + \text{CH}_3 \]

d) \[ \text{Cl} + \text{O}_3 \rightarrow \text{ClO} + \text{O}_2 \]
   \[ \text{Cl} + \text{O}_3 \rightarrow \text{ClO} + \text{O}_2 \]

e) \[ \text{Cl} + \text{O} \rightarrow \text{Cl} + \text{O}_2 \]
   \[ \text{Cl} + \text{O} \rightarrow \text{Cl} + \text{O}_2 \]

Options:
1. a, c, d
2. a, b, c
3. b, d, e
4. b, c, d
Identify the initiation step/s (X) and termination step/s (Y) of free radical chlorination of CH₄ from the following.

X: CH₃ + Cl → CH₃Cl, CH₃ + Cl₂ → CH₃Cl + Cl, CH₄ + Cl → CH₃ + HCl, CH₃ + CH₃ → CH₃ + CH₃

Y: Cl + Cl → Cl₂, Cl₂ → 2Cl

Options:
1. c, d, a, b
2. b, d, a, c, e
3. d, e, b, c, f
4. d, a, b, f

The alkenes which exhibit cis, trans isomerism from the following are

X: YXC = CXZ, YXC = CXY, X₂C = CXY

Y: X₂C = CX₂, YXC = CWZ

Options:
1. b, d, e
2. a, b
3. a, c, d
4. c, d, e
Which of the following structures are aromatic?

Options:
1. a, c, e
2. b, c, d, e
3. a, b, c
4. b, d

The relationship between the radius \( r \) of the atom and the edge length \( a \) of the cubic close packing structure is:

Options:
1. \( r = \frac{\sqrt{3}}{4} a \)
2. \( r = \frac{a}{2\sqrt{2}} \)
3. \( r = \frac{a}{\sqrt{2}} \)
4. \( r = \frac{a}{2\sqrt{3}} \)
At T(K), the vapour pressure of pure benzene (molar mass = 78 g mol\(^{-1}\)) is 0.85 bar. When 2.0 g of non-volatile, non-electrolyte solute is added to 39 g of benzene, the vapour pressure of solution at T(K) is 0.83 bar. The elevation in boiling point (in K) of the same solution is: 

(K\(_b\) of benzene is 2.6 K kg mol\(^{-1}\))

Options:
1. 0.0784  
2. 0.196  
3. 1.568  
4. 0.784

---

At 27°C, two liquids A and B form an ideal solution with mole fractions 0.67 and 0.33 respectively. If the vapour pressure of pure A and B at 27°C are 300 mm and 450 mm respectively, the total vapour pressure of the solution in mm is:

27°C నుండి A, B దొరుకున్న అంతర్భాగాల వైపు ప్రాంతాలు. అంశాలు: A, B యొక్క అంతర్భాగాలు 0.67, 0.33. 27°C నుండి A, B దొరుకున్న అంతర్భాగాలు 300 mm, 450 mm తో జీవికమైన ఇతర అంతర్భాగాలను మిశ్ర మాత్రమును ఎంత?

Options:
1. 349.5  
2. 700  
3. 249.5  
4. 148.5
The conductivity of 0.001 M acetic acid at a certain temperature is $5.07 \times 10^{-5} \text{ S cm}^{-1}$. If $\kappa_0$ of acetic acid at the same temperature is $390 \text{ S cm}^2 \text{ mol}^{-1}$, the dissociation constant of acetic acid at that temperature is:

Options:
1. $1.94 \times 10^{-5}$
2. $1.94 \times 10^{-3}$
3. $1.94 \times 10^{-4}$
4. $1.94 \times 10^{-6}$

The time taken for half of the initial amount of N$_2$O$_5$ to decompose is 12 min at 310 K and 2 hrs at 300 K. The activation energy of reaction in kJ is ($R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$)

Options:
1. 177.76
2. 17.776
3. 355.52
4. 35.552

Which one of the following statements is not correct?

Options:
A mixture of noble gases can be separated by adsorption on coconut charcoal at different temperatures.

Animal charcoal removes colours of impure coloured solutions by adsorption process.

Adsorption of reactants on the solid surface of the catalysts increases the rate of reaction.

Silica gel and alumina gel are used as adsorbents to increase moisture in air in the rooms.

Identify the statements which are not correct.

a) Copper is refined by Van-Arkel method
b) Zinc is refined by electrolysis method
c) Zirconium is refined by distillation method

d) स्वच्छ वायु-प्रशिक्षण में भागीदार
b) धूर्तता दर्शक वायु-प्रशिक्षण में भागीदार
c) धूर्तता केसरी वायु-प्रशिक्षण में भागीदार

Options:
1. a, b
2. a, b, c
3. a, c
4. b, c
In which of the following reactions, NO₂ is not liberated?

Which of the following statements is not correct?

Question Number: 147  Question Id: 1017174467  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Question Number: 148  Question Id: 1017174468  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
Xe (g) and F₂ (g) reacted in the ratio 1 : 20 at 573 K, 60-70 bar, to form A. When A is completely hydrolyzed, B and HF are formed. A and B are respectively

573 K, 60-70 అందులో ప్రవేశించడానికి ప్రస్తుతించబడిన Xe (g) మరియు F₂ (g) మూలము మూడు బారు కాంతిగా A యేదులోము. A యేదులోము పైన ఇద్దరు భాగాలు అవసరం B యేదులోము HF వేయాలి. A యేదులోము B యేదులోము

Options:
1. XeF₂, O₂
2. XeF₆, XeO₃
3. XeF₄, XeOF₄
4. XeF₄, XeO₂F₂

Question Number: 149  Question Id: 1017174469  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Cu²⁺ does not form CuI₂. This is because Cu²⁺

CuI₂ is Cu²⁺ and I⁻. Mole of Cu²⁺

Options:
1. reduces I⁻ to I⁻
2. I⁻ to I⁻ ను ప్రవేశించబడిన I⁻ ను ప్రవేశించబడిన I⁻

undergoes self-oxidation and reduction to form Cu and Cu³⁺

3. Cu₂I₂ ఒక ధాన్యత ప్రవేశించబడిన ధాన్యత ప్రవేశించబడిన ధాన్యత ప్రవేశించబడిన

oxidizes I⁻ to I₂

4. I⁻ ను I₂ ను ప్రవేశించబడిన I⁻

is unstable in water

5. ఒక ధాన్యత ప్రవేశించబడిన ధాన్యత ప్రవేశించబడిన

Question Number: 150  Question Id: 1017174470  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

The complex which does not exhibit geometrical isomerism is

చెట్టు ప్రవేశించబడిన చెట్టు ప్రవేశించబడిన

Options:
1. [Co(NH₃)₅Cl]Cl₂
Identify the monomer that can undergo polymerisation by free radical, cationic and anionic mechanisms.

Options:
1. Vinyl chloride
2. Acrylonitrile
3. Styrene
4. Isobutylene
Which of the following statements are not correct?

ఎందుకు సమయానికి ప్రత్యేక రాలు ఉంటాయి?

a) Antihistamine also functions as an antacid
ద్రవ్యవిషయాలుగా, ఇది యొక్క రకాని మాత్రము

b) The shape of an active site of an enzyme does not change when the drug binds to an allosteric site
స్థితి స్త్రోతిని సృష్టి కలిగిన ప్రశ్నానికి, ద్రవ్యం కంతిని చేతి చేతి మాత్రము

c) Chemical messengers communicate the message between two neurons
రోమాచన రూమాచన పదార్థాలు రూమాచన పదార్థాల మిశ్రమానికి రాతితే రూమాచన పదార్థాల సమాధానం

d) Potassium soaps are hard, while sodium soaps are soft to skin
పొత్సాంగు జలతిమ్పు దీని జలతిమ్మ సముదాయం, సోడా జలతిమ్పు జలతిమ్మ సముదాయం కల్పనలు

The correct answer is

ఎంపిక నమోదాం

Options:
1. a, b, d
2. b, c, d
3. a, c
4. c, d
Consider the following structure.

\[ \text{For codeine } R \text{ stands for} \]

Options:
1. \(-\text{OAc}\)
2. \(-\text{OCH}_3\)
3. \(-\text{OH}\)
4. \(-\text{NH}_2\)

Question Number: 154  Question Id: 1017174474  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical
Match the following:

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Vitamin E</td>
<td>i) Meat</td>
</tr>
<tr>
<td>b) Vitamin K</td>
<td>ii) Sunflower oil</td>
</tr>
<tr>
<td>c) Vitamin B₁₂</td>
<td>iii) Egg white</td>
</tr>
<tr>
<td>d) Vitamin B₂</td>
<td>iv) Exposure to sunlight</td>
</tr>
<tr>
<td></td>
<td>v) Green leafy vegetables</td>
</tr>
</tbody>
</table>

The correct answer is:

Options:

1. (a) iii (b) ii (c) iv (d) i
2. (a) ii (b) v (c) i (d) iii
3. (a) i (b) iii (c) ii (d) v
4. (a) iv (b) i (c) v (d) ii

Question Number : 155  Question Id : 1017174475  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Which of the following reasons support that arylhalides are less reactive than alkyl halides towards nucleophilic substitution reactions?

a) The formation of more stable arenium ion
b) Partial double bond character of C–X bond
c) Longer C–X bond
d) sp² carbon bonded to X is more electronegative

Options:
1. a, b
2. b, c
3. b, d
4. a, d

The major products A and B in the following reactions are respectively

i) \[
\text{\textbf{C\textsubscript{6}H\textsubscript{5}Cl}} \xrightarrow{\text{Cl}_2/\text{hv}, 500K} \text{A}
\]

ii) \[
\text{\textbf{C\textsubscript{6}H\textsubscript{5}CH\textsubscript{3}}} \xrightarrow{\text{HI}} \text{B}
\]

Options:
The compound formed when propanone is made to react with ethyl magnesium bromide followed by hydrolysis is

Options:

2-Methylbutan-2-ol

2-మేథ్లూ బ్యుతన-2-఑ల్
What are A, B, C and D in the following reactions?

A. B. C మాత్రమే D ఎందుకు?

\[
\text{Aniline} \xrightarrow{\text{HCl}, 273K} \text{A} \rightarrow \text{B} \rightarrow \text{Phenol}
\]

\[
\text{Cumene} \xrightarrow{\text{O}_2} \text{C} \rightarrow \text{D} \rightarrow \text{Phenol} + \text{acetone}
\]

Options:

\[
\begin{align*}
\text{A} & & \text{B} & & \text{C} & & \text{D} \\
\begin{array}{c}
\text{Cl} \\
623K/300 \text{ atm}
\end{array} & & \begin{array}{c}
\text{CH}_3 \\
\text{H}_3\text{C}-\text{C}-\text{OH}
\end{array} & & \begin{array}{c}
\text{H}_2\text{O}_2
\end{array} & & \begin{array}{c}
\text{H}^+ / \text{H}_2\text{O}_2
\end{array}
\end{align*}
\]
Identify A and B in the following reactions

$$R - \text{CHO} \xrightarrow{A} R - \text{CH}_2\text{OH} \xleftarrow{B} R - \text{COOH}$$

Options:

A: NaBH₄  
B: H₂/Pd

H₂/Pd: i) LiAlH₄   
ii) H₃O⁺

SnCl₂  
MnO₂

1. NaBH₄  
SnCl₂

A: H₂/Pd
B: i) LiAlH₄   
ii) H₃O⁺

A: SnCl₂  
B: MnO₂
Identify Z in the above sequence of reactions.

Options:

1. 

2. 

3. 

4. 

OCR results for the options:

1. 

2. 

3. 

4.