Question Number : 1  Question Id : 1874633681  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ f(x) = \frac{x}{e^x - 1} + \frac{x}{2} + 2\cos^3 \frac{x}{2} \text{ on } R-\{0\} \text{ is} \]

\[ R-\{0\} \ni f(x) = \frac{x}{e^x - 1} + \frac{x}{2} + 2\cos^3 \frac{x}{2} \text{ ఉంది} \]

Options :
1. One one function
   ఒనం ఒనం

2. Bijection
   బియెక్షన్

3. Algebraic function
   అగ్మెటిక్ ఫంక్షన్

4. Even function
   ఎవన్ ఫంక్షన్

Mathematics
Display Number Panel: Yes
Group All Questions: No
Consider the following lists.

List - I

A) \( f(x) = \frac{|x+2|}{x+2}, x \neq -2 \)
B) \( g(x) = [x], x \in \mathbb{R} \)
C) \( h(x) = |x-[x]|, x \in \mathbb{R} \)
D) \( f(x) = \frac{1}{2 - \sin 3x}, x \in \mathbb{R} \)

List - II

I) \( \left[ \frac{1}{3}, 1 \right] \)
II) \( \mathbb{Z} \)
III) \( \mathbb{W} \)
IV) \( [0, 1) \)
V) \( \{-1, 1\} \)

Match the functions in List - I with their ranges in List - II and choose the correct answer.

Options:

1. A B C D
2. V III II I
3. A B C D
4. V III IV I
5. A B C D
6. I II III IV
Assertion (A): \((1 + (1+2+4) + (4+6+9) + (9+12+16) + \ldots + (81+90+100) = 1000\)

Reason (R): \(\sum_{r=1}^{n} (r^3 - (r-1)^3) = n^3\) for any natural number \(n\)

\(\text{విపరీతం (A)}:\quad (1 + (1+2+4) + (4+6+9) + (9+12+16) + \ldots + (81+90+100) = 1000\)

\(\text{రాయం (R)}:\quad \text{నేటి \text{సింహాసన} \text{పంపించండి \text{రాయం (R)} \text{అధికారి (A) యెంచించి మనంప్పు}}\)

Options:

- Both (A) and (R) are true and (R) is the correct explanation of (A)
- Both (A) and (R) are true but (R) is not the correct explanation of (A)
- (A) is true but (R) is false
- (A) యెంచించింది (R) అనంతం
- (A) is false but (R) is true
- (A) యెంచించింది (R) అనంతం

If \(A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}, P = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}\) and \(X = APA^T\) then \(A^TX^{50}A = \)

\(A = \begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}, P = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}\) and \(X = APA^T\) then \(A^TX^{50}A = \)

Options:

\[
\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}
\]
If \([x]\) is the greatest integer less than or equal to \(x\) and \(|x|\) is the modulus of \(x\), then the system of three equations
\[2x + 3|y| + 5|z| = 0,\ x + |y| - 2|z| = 4,\ x + |y| + |z| = 1\]
has

\[\begin{bmatrix} 2 & 1 \\ 0 & -1 \end{bmatrix} \]
\[\begin{bmatrix} 25 & 1 \\ 1 & -25 \end{bmatrix} \]
\[\begin{bmatrix} 1 & 50 \\ 0 & 1 \end{bmatrix} \]

Options:

1. a unique solution
2. finitely many solutions
3. infinitely many solutions
4. no solution
Investigate the values of $\lambda$ and $\mu$ for the system $x + 2y + 3z = 6$, $x + 3y + 5z = 9$, $2x + 5y + \lambda z = \mu$ and match the values in List - I with the items in List - II.

$x + 2y + 3z = 6$, $x + 3y + 5z = 9$, $2x + 5y + \lambda z = \mu$ అనే రేఖాసంఖ్యాంశాల నుండి $\lambda$, $\mu$ మీద నిర్ధిష్టం.

సంఖ్యాంశాలు - Iసాగితాంపాడు సంఖ్యాంశాలు - II సాగితాంపాడు లభ్యం

**List - I**

| A) $\lambda = 8$, $\mu \neq 15$ |
| B) $\lambda \neq 8$, $\mu \in \mathbb{R}$ |
| C) $\lambda = 8$, $\mu = 15$ |

**List - II**

| I) Infinitely many solutions |
| II) No solution |
| III) Unique solution |

The correct match is

The options are:

1. A B C
2. A B C
3. A B C
Question Number : 7  Question Id : 1874633687  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( z = x + iy, \ x, y \in \mathbb{R}, \ (x, y) \neq (0, -4) \) and \( \text{Arg} \left( \frac{2z - 3}{z + 4i} \right) = \frac{\pi}{4} \), then the locus of \( z \) is

\[ z = x + iy, \ x, y \in \mathbb{R}, \ (x, y) \neq (0, -4) \]

Options:

1. \( 2x^2 + 2y^2 + 5x + 5y - 12 = 0 \)
2. \( 2x^2 - 3xy + y^2 + 5x + y - 12 = 0 \)
3. \( 2x^2 + 3xy + y^2 + 5x + y + 12 = 0 \)
4. \( 2x^2 + 2y^2 - 11x + 7y - 12 = 0 \)

Question Number : 8  Question Id : 1874633688  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( z = x + iy, \ x, y \in \mathbb{R} \) and the imaginary part of \( \frac{\bar{z} - 1}{\bar{z} - i} \) is 1 then the locus of \( z \) is

\[ z = x + iy, \ x, y \in \mathbb{R} \]

Options:

1. \( x + y + 1 = 0 \)
2. \( x + y + 1 = 0, \ (x, y) \neq (0, -1) \)
3. \( x^2 + y^2 - x + 3y + 2 = 0 \)
4. \( x^2 + y^2 - x + 3y + 2 = 0 \); \((x, y) \neq (0, -1)\)

Question Number : 9  Question Id : 1874633689  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \omega \) represents a complex cube root of unity, then

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

\( \omega \) అయితే నావికం నారాను ఉండు లేదా నారాయణ నారాయణ నారాయణ

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

Options :

1. \( \frac{n(n^2 + 1)}{3} \)
2. \( \frac{n(n^2 + 2)}{3} \)
3. \( \frac{n(n^2 - 2)}{3} \)
4. \( \frac{n^2(n - 1)}{6} \)

Question Number : 10  Question Id : 1874633690  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \omega \) is a complex cube root of unity then

\[
\sum_{r=1}^{9} r(r + 1 - \omega)(r + 1 - \omega^2) = 
\]

\( \omega \) అయితే నావికం నారాను ఉండు లేదా నారాయణ నారాయణ నారాయణ

\[
\sum_{r=1}^{9} r(r + 1 - \omega)(r + 1 - \omega^2) = 
\]

Options :
Question Number : 11  Question Id : 1874633691  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \alpha \) and \( \beta \) are the roots of \( x^2 + 7x + 3 = 0 \) and \( \frac{2\alpha}{3 - 4\alpha}, \frac{2\beta}{3 - 4\beta} \) are the roots of \( ax^2 + bx + c = 0 \) and GCD of \( a, b, c \) is 1 then \( a + b + c = \)

\[
x^2 + 7x + 3 = 0 \text{ తెరావుకుడిగి } \ \\
\alpha, \beta \ అమృతి, \ ax^2 + bx + c = 0 \text{ తెరావుకుడిగి } \ \\
\frac{2\alpha}{3 - 4\alpha}, \frac{2\beta}{3 - 4\beta} \text{ ఎంపైని a, b, c తప్పిం కురికి 1 ఆవిష్కరించి a + b + c = }
\]

Options :
1. 11
2. 0
3. 243
4. 81

Question Number : 12  Question Id : 1874633692  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( \alpha, \beta \) are the roots of \( x^2 + bx + c = 0 \), \( \gamma, \delta \) are the roots of \( x^2 + b_1x + c_1 = 0 \) and \( \gamma < \alpha < \delta < \beta \), then \( (c - c_1)^2 < \)

\[
\alpha, \beta \text{ ఎక్కడ } x^2 + bx + c = 0 \text{ తెరావుకుడిగి, } \ \\
\gamma, \delta \text{ ఎక్కడ } x^2 + b_1x + c_1 = 0 \text{ తెరావుకుడిగి, } \ \\
\gamma < \alpha < \delta < \beta \text{ ఎంపైని } (c - c_1)^2 <
\]

Options :
1. \((b_1 - b)(bc_1 - b_1c)\)
2. \((b - b_1)^2\)

3. \((c - c_1)(b_1c - b_1c_1)\)

Let \(a, b, c\) be the sides of a scalene triangle. If \(\lambda\) is a real number such that the roots of the equation \(x^2 + 2(a+b+c)x + 3\lambda(ab+bc+ca) = 0\) are real then the interval in which \(\lambda\) lies is

\[\left(-\infty, \frac{4}{3}\right)\]

\[\left(\frac{5}{3}, \infty\right)\]

\[\left(\frac{1}{3}, \frac{5}{3}\right)\]

\[\left[\frac{4}{3}, \infty\right)\]

The polynomial equation of degree 4 having real coefficients with three of its roots as \(2 \pm \sqrt{3}\) and \(1 + 2i\), is

\[2 \pm \sqrt{3}, 1 + 2i, \text{ and complex conjugates}\]

Options:
1. \[x^4 - 6x^3 - 14x^2 + 22x + 5 = 0\]

2. \[x^4 - 6x^3 - 19x + 22x - 5 = 0\]

3. \[x^4 - 6x^3 + 19x - 22x + 5 = 0\]

4. \[x^4 - 6x^3 + 14x^2 - 22x + 5 = 0\]

Question Number : 16  Question Id : 1874633696  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A student is allowed to choose atmost \(n\) books from a collection of \(2n+1\) books. If the total number of ways in which he can select atleast one book is 255, then the value of \(n\) is

\[2n+1 \text{ choose } n \text{ } \begin{cases} \text{if } n + \frac{\sqrt{8n^2 + 4n - 3}}{4} = 255 \text{ and } n \text{ is an integer} \\ \text{else} \end{cases}\]
The sum of all the coefficients in the binomial expansion of \((1+2x)^n\) is 6561. Let 
\[ R = (1+2x)^n = I + F \] 
where \(I \in \mathbb{N}\) and \(0 < F < 1\). If \(x = \frac{1}{\sqrt{2}}\), then 
\[ 1 - \frac{F}{1 + (\sqrt{2} - 1)^4} = \]

\[(1+2x)^n \text{ సమాచారం వృత్తి మధ్య ఎమముఖమ్ము మూడు పదాలు సంఖ్య 6561.} \] 
\[ R = (1+2x)^n = I + F, \quad I \in \mathbb{N}, \] 
\[ 0 < F < 1 \text{ తెలిపబడింది.} \quad x = \frac{1}{\sqrt{2}} \text{ యొక్కుడు} \quad 1 - \frac{F}{1 + (\sqrt{2} - 1)^4} = \]

Options:

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

2. \(4(3\sqrt{2} + 4)\)

3. \((\sqrt{2} - 1)^4\)

4. 1

If \(\frac{(1-px)^{-1}}{(1-qx)} = a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots\ldots,\) then \(a_n = \)

\[\frac{(1-px)^{-1}}{(1-qx)} = a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots\ldots, \] 
\[\text{విషయమ్ము} \quad a_n = \]
If \( \frac{3}{(x-1)(x^2 + x + 1)} = \frac{1}{x-1} - \frac{x+2}{x^2 + x + 1} = f_1(x) - f_2(x) \) and
\[
\frac{x+1}{(x-1)^2 (x^2 + x + 1)} = A f_1(x) + \left( B + \frac{D}{x-1} \right) f_2(x) + \frac{C}{(x-1)^2},
\]
then \( A + B + C + D = \)

\[
\frac{3}{(x-1)(x^2 + x + 1)} = \frac{1}{x-1} - \frac{x+2}{x^2 + x + 1} = f_1(x) - f_2(x)
\]

\[
\frac{x+1}{(x-1)^2 (x^2 + x + 1)} = A f_1(x) + \left( B + \frac{D}{x-1} \right) f_2(x) + \frac{C}{(x-1)^2}
\]

Options:

1. 1
2. \(-1\)
3. 0
Let \( M \) and \( m \) respectively denote the maximum and the minimum values of \( \left[ f(\theta) \right]^2 \) where

\[
f(\theta) = \sqrt{a^2 \cos^2 \theta + b^2 \sin^2 \theta + \sqrt{a^2 \sin^2 \theta + b^2 \cos^2 \theta}}.
\]

Then \( M - m = \)

\[
f(\theta) = \sqrt{a^2 \cos^2 \theta + b^2 \sin^2 \theta + \sqrt{a^2 \sin^2 \theta + b^2 \cos^2 \theta}} \quad \text{where} \quad \left[ f(\theta) \right]^2 = \text{constant on both}
\]

\[
\text{both sides of} \quad M, \ m \quad \text{and} \quad \text{both} \quad \text{sides} \quad \text{of} \quad M - m =
\]

Options:

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

If \( \cos A = -\frac{60}{61} \) and \( \tan B = -\frac{7}{24} \) and neither \( A \) nor \( B \) is in the second quadrant, then the angle \( A + \frac{B}{2} \) lies in the quadrant

\[
\cos A = -\frac{60}{61}, \quad \tan B = -\frac{7}{24} \quad \text{and} \quad \text{neither} \quad A \quad \text{nor} \quad B \quad \text{is in the second quadrant, then the}
\]

\[
A + \frac{B}{2} \quad \text{lies in the}
\]

Options:

1. 1
2. 2
3. \(\cos^2 5^\circ - \cos^2 15^\circ - \sin^2 15^\circ + \sin^2 15^\circ + \cos 15^\circ \sin 15^\circ - \cos 5^\circ \sin 35^\circ = \)

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

Question Number : 23  Question Id : 1874633703  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(\cos \theta \neq 0\) and \(\sec \theta - 1 = (\sqrt{2} - 1) \tan \theta\) then \(\theta = \)

\(\cos \theta \neq 0\)  
\(\sec \theta - 1 = (\sqrt{2} - 1) \tan \theta\)  
\(\theta = \)

Options:
1. \(n\pi + \frac{\pi}{8}, n \in \mathbb{Z}\)
2. \(2n\pi + \frac{\pi}{4}, (or) 2n\pi, n \in \mathbb{Z}\)
3. \(2n\pi + \frac{\pi}{8}, n \in \mathbb{Z}\)
4. \(2n\pi - \frac{\pi}{4}, (or) 2n\pi, n \in \mathbb{Z}\)
Question Number : 24  Question Id : 1874633704  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
\[
\cot \left[ \sum_{n=3}^{32} \cot^{-1} \left( 1 + \sum_{k=1}^{n} 2k \right) \right] = \\
\]
Options :
\[
\begin{align*}
1. & \quad \frac{10}{3} \\
2. & \quad \frac{8}{3} \\
3. & \quad \frac{14}{3} \\
4. & \quad \frac{16}{3}
\end{align*}
\]

Question Number : 25  Question Id : 1874633705  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \( \sin x \cosh y = \cos \theta, \cos x \sinh y = \sin \theta \) and \( 4 \tan x = 3 \). Then \( \sinh^2 y = \)
\[
\sin x \cosh y = \cos \theta, \cos x \sinh y = \sin \theta \quad \quad 4 \tan x = 3 \quad \quad \sinh^2 y = \\
\]
Options :
\[
\begin{align*}
1. & \quad \frac{4}{5} \\
2. & \quad \frac{9}{16} \\
3. & \quad \frac{9}{25} \\
4. & \quad \frac{16}{25}
\end{align*}
\]

Question Number : 26  Question Id : 1874633706  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
In triangle ABC, if \( \frac{b+c}{9} = \frac{c+a}{10} = \frac{a+b}{11} \), then \( \frac{\cos A + \cos B}{\cos C} = \)

\( \text{ABC త్రికోణం, } \frac{b+c}{9} = \frac{c+a}{10} = \frac{a+b}{11} \text{ వాటికే, } \frac{\cos A + \cos B}{\cos C} = \)

Options:
1. \( \frac{9}{10} \)
2. \( \frac{10}{11} \)
3. \( \frac{11}{12} \)
4. \( \frac{12}{13} \)
In a \( \Delta ABC \), with usual notation, match the items in List - I with the items in List - II and choose the correct option.

\[ \begin{align*}
\text{List - I (ఉపయోగం - I)} & \quad \text{List - II (ఉపయోగం - II)} \\
A) & \quad \frac{r_1 r_2}{\sqrt{\frac{4R-r_1-r_2}{r_1+r_2}}} & I) & \quad b \\
B) & \quad \frac{r_2 (r_3+r_1)}{\sqrt{r_1^2+r_2^2+r_3^2}} & II) & \quad a^2, b^2, c^2 \text{ are in AP} \\
C) & \quad \frac{a}{c} = \frac{\sin(A-B)}{\sin(B-C)} & III) & \quad \Delta \\
D) & \quad bc \cos^2 \frac{A}{2} & IV) & \quad R r_1 r_2 r_3 \\
V) & \quad s (s-a) & V) & \quad s (s-a)
\end{align*} \]

The correct match is

**Options:**

1. IV III I V
2. V IV III II
3. III I II V
4. If \(a, b\) and \(c\) are the sides of \(\Delta ABC\) for which \(r_1 = 8, r_2 = 12\) and \(r_3 = 24\) then the ordered triad \((a, b, c) = \)

\[ a, b, c = \Delta ABC \text{ ఎక్కడ ఎక్కడ, } r_1 = 8, r_2 = 12, r_3 = 24 \text{ యొక్క ఎక్కడ ఎక్కడ} \ (a, b, c) = \]

Options:
1. \((12, 20, 16)\)
2. \((12, 16, 20)\)
3. \((16, 12, 20)\)
4. \((20, 16, 12)\)

Question Number : 29  Question Id : 1874633709  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(4\vec{i} + 7\vec{j} + 8\vec{k}, 2\vec{i} + 3\vec{j} + 4\vec{k}, 2\vec{i} + 5\vec{j} + 7\vec{k}\) are respectively the position vectors of the vertices \(A, B, C\) of \(\Delta ABC\), then the position vector of the point where the bisector of angle \(A\) meet \(\overline{BC}\) is

\[ \Delta ABC \text{ ఎక్కడ, } A, B, C \text{ ఎక్కడ ఎక్కడ ఎక్కడ ఎక్కడ, } 4\vec{i} + 7\vec{j} + 8\vec{k}, 2\vec{i} + 3\vec{j} + 4\vec{k}, 2\vec{i} + 5\vec{j} + 7\vec{k} \text{ ఎక్కడ, } \text{ ప్రత్యేకంగా ఆ ఎక్కడ ఎక్కడ ఎక్కడ} \]

Options:
1. \(2\vec{i} + \frac{13}{3}\vec{j} + 2\vec{k}\)
2. \(2\vec{i} - \frac{13}{3}\vec{j} + 6\vec{k}\)
3. \[ 2\mathbf{i} + 13\mathbf{j} + 6\mathbf{k} \]

4. \[ 2\mathbf{i} + \frac{13}{3}\mathbf{j} + 6\mathbf{k} \]

Question Number : 30  Question Id : 1874633710  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation of the plane passing through the point \( \mathbf{i} + 2\mathbf{j} - \mathbf{k} \) and perpendicular to the line of intersection of the planes \( \mathbf{r} \cdot (3\mathbf{i} - \mathbf{j} + \mathbf{k}) = 1 \) and \( \mathbf{r} \cdot (\mathbf{i} + 4\mathbf{j} - 2\mathbf{k}) = 2 \), is

\[ \mathbf{r} \cdot (\mathbf{i} + 2\mathbf{j} - \mathbf{k}) = 1 \]

Options :
1. \( \mathbf{r} \cdot (-2\mathbf{i} - 5\mathbf{j} + \mathbf{k}) = 0 \)
2. \( \mathbf{r} \cdot (\mathbf{i} + 7\mathbf{j} + 4\mathbf{k}) = 0 \)
3. \( \mathbf{r} \cdot (2\mathbf{i} - 7\mathbf{j} - 13\mathbf{k}) = 1 \)
4. \( \mathbf{r} \cdot (-2\mathbf{i} + 7\mathbf{j} + 13\mathbf{k}) = 0 \)

Question Number : 31  Question Id : 1874633711  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the position vectors of the vertices A, B and C of \( \triangle ABC \) are \( \mathbf{i} + 2\mathbf{j} - 5\mathbf{k}, -2\mathbf{i} + 2\mathbf{j} + \mathbf{k} \) and \( 2\mathbf{i} + \mathbf{j} - \mathbf{k} \) respectively then \( \angle B = \)

\( \angle B = \cos^{-1} \left( \frac{7}{3\sqrt{10}} \right) \)

Options :
1. \( \cos^{-1} \left( \frac{7}{3\sqrt{10}} \right) \)
2. \( \cos^{-1} \left( \frac{8}{\sqrt{105}} \right) \)

3. \( \cos^{-1} \left( \frac{1}{\sqrt{42}} \right) \)

4. \( \cos^{-1} \left( -\frac{7}{3\sqrt{10}} \right) \)

**Question Number : 32  Question Id : 1874633712  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the position vectors of the vertices of \( \Delta ABC \) are \( \overrightarrow{OA} = 3\mathbf{i} + \mathbf{j} + 2\mathbf{k}, \overrightarrow{OB} = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k} \) and \( \overrightarrow{OC} = 2\mathbf{i} + 3\mathbf{j} + \mathbf{k} \), then the length of the altitude of \( \Delta ABC \) drawn from \( A \) is

\[ \text{ABC అకర్షాయం సిద్ధించింది, పోషాయం సిద్ధించింది.} \]

\[ \overrightarrow{OA} = 3\mathbf{i} + \mathbf{j} + 2\mathbf{k}, \overrightarrow{OB} = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k} \]

\[ \overrightarrow{OC} = 2\mathbf{i} + 3\mathbf{j} + \mathbf{k} \] అనేక, \( \text{ABC అకర్షాయం సిద్ధించింది} \) కాక పోషాయం కాక అవసరం.  

**Options :**

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

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

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

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

**Question Number : 33  Question Id : 1874633713  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**
A new tetrahedron is formed by joining the centroids of the faces of a given tetrahedron OABC. Then the ratio of the volume of the new tetrahedron to that of the given tetrahedron is

\[ \frac{OABC}{\text{new tetrahedron}} = \frac{1}{27} \]

Options:

1. \( \frac{3}{25} \)
2. \( \frac{1}{27} \)
3. \( \frac{5}{62} \)
4. \( \frac{1}{162} \)

Let \( \vec{A} = 2\vec{i} + \vec{j} - 2\vec{k} \) and \( \vec{B} = \vec{i} + \vec{j} \). If \( \vec{C} \) is a vector such that \( \vec{A} \cdot \vec{C} = |\vec{C}| \), \( |\vec{C} - \vec{A}| = 2\sqrt{2} \) and the angle between \( \vec{A} \times \vec{B} \) and \( \vec{C} \) is 30°, then the value of \( |(\vec{A} \times \vec{B}) \times \vec{C}| \) is

\[ |(\vec{A} \times \vec{B}) \times \vec{C}| = \frac{1}{2} \]

Options:

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

4.

Question Number : 35  Question Id : 1874633715  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \(a_0, a_1, \ldots, a_{11}\) are in an arithmetic progression with common difference \(d\), then their mean deviation from their arithmetic mean is

\[a_0, a_1, \ldots, a_{11}\text{ are } d\text{ and their mean deviation from their arithmetic mean is}\]

Options :

1. \(\frac{30}{11} |d|\)

2. \(2 |d|\)

3. \(3 |d|\)

4. \(12 |d|\)

Question Number : 36  Question Id : 1874633716  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The variance of the following continuous frequency distribution is

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>0-10</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Options :

1. 201
If two sections of strengths 30 and 45 are formed from 75 students who are admitted in a school, then the probability that two particular students are always together in the same section is

\[
\frac{66}{185}
\]

\[
\frac{19}{37}
\]

\[
\frac{29}{185}
\]

\[
\frac{18}{37}
\]
A bag contains \(2n\) coins out of which \(n-1\) are unfair with heads on both sides and the remaining are fair. One coin is picked from the bag at random and tossed. If the probability that head falls in the toss is \(\frac{41}{56}\), then the number of unfair coins in the bag is

\[\text{Number of unfair coins} = 2n - (n-1) = n + 1\]

Options:
1. 18
2. 15
3. 13
4. 14

Bag A contains 6 Green and 8 Red balls and bag B contains 9 Green and 5 Red balls. A card is drawn at random from a well shuffled pack of 52 playing cards. If it is a spade, two balls are drawn at random from bag A, otherwise two balls are drawn at random from bag B. If the two balls drawn are found to be of the same colour, then the probability that they are drawn from bag A is

\[\text{Probability} = \frac{\text{Favourable outcomes}}{\text{Total outcomes}}\]

Options:
1. \(\frac{43}{181}\)
A random variable $X$ has the probability distribution

<table>
<thead>
<tr>
<th>$X = x_i$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P(X = x_i)$</td>
<td>0.2</td>
<td>0.3</td>
<td>0.12</td>
<td>0.1</td>
<td>0.2</td>
<td>0.08</td>
</tr>
</tbody>
</table>

If $A = \{x_j/x_j \text{ is a prime number}\}$, $B = \{x_j/x_j < 4\}$ are two events then $P(A \cup B) =$

<table>
<thead>
<tr>
<th>$X = x_i$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P(X = x_i)$</td>
<td>0.2</td>
<td>0.3</td>
<td>0.12</td>
<td>0.1</td>
<td>0.2</td>
<td>0.08</td>
</tr>
</tbody>
</table>

$A = \{x_j/x_j \text{ are (even or odd)}\}$, $B = \{x_j/x_j < 4\}$ and $x_j \text{ is even}$ and $x_j \text{ is odd}$ $P(A \cup B) =$

Options:

1. 0.31
2. 0.62
3. 0.82
4. 0.41
In a Poisson distribution with unit mean, \( \sum_{x=0}^{\infty} |x - \bar{x}| P(X = x) = \)

(\( \bar{x} \) is the mean of the distribution)

\[ \sum_{x=0}^{\infty} |x - \bar{x}| P(X = x) = \]

(\( \bar{x} \) is the mean of the distribution)

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

Question Number : 42  Question Id : 1874633722  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Two straight rods of lengths 2a and 2b move along the coordinate axes in such a way that their extremities are always concyclic. Then the locus of the centres of such circles is

\[ 2a + 2b \]

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

When the coordinate axes are rotated about the origin in the positive direction through an angle \( \frac{\pi}{4} \), if the equation \( 25x^2 + 9y^2 = 225 \) is transformed to \( \alpha x^2 + \beta xy + \gamma y^2 = \delta \), then

\[
\left( \alpha + \beta + \gamma - \sqrt{\delta} \right)^2 =
\]

Options:
1. 3
2. 9
3. 4
4. 16

---

The equation of the line through the point of intersection of the lines \( 3x - 4y + 1 = 0 \) and \( 5x + y - 1 = 0 \) and making equal non-zero intercepts on the coordinate axes is

\[
3x - 4y + 1 = 0 \\
5x + y - 1 = 0
\]

Options:
1. \( 2x + 2y = 3 \)
2. \( 23x + 23y = 6 \)
3. \[23x + 23y = 11\]
4. \[2x + 2y = 7\]

Question Number : 45  Question Id : 1874633725  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The line through P \((a, 2)\), where \(a \neq 0\), making an angle 45° with the positive direction of the X-axis meets the curve \(\frac{x^2}{9} + \frac{y^2}{4} = 1\) at A and D and the coordinate axes at B and C. If PA, PB, PC and PD are in a geometric progression then \(2a =\)

\[\frac{\frac{x^2}{9} + \frac{y^2}{4} = 1}{\text{A, B, C, D are points on the curve.}}\]

Options :
1. 13
2. 7
3. 1
4. \(-13\)

Question Number : 46  Question Id : 1874633726  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The equation of the perpendicular bisectors of the sides AB and AC of a \(\Delta ABC\) are \(x - y + 5 = 0\) and \(x + 2y = 0\) respectively. If A is \((1, -2)\), then the equation of the straight line BC is

\[\Delta ABC \text{ సమూహం} \text{ AB కంటే AC తో అంశాంశంలో ఆముఖికతెల్లుతుంది.} \text{ అందుకే} x - y + 5 = 0 \text{ అంశాంశం} x + 2y = 0. \text{ A (1, -2) అంశాంశం, అందుకే} \text{ BC తో అంశాంశం ఆముఖికతెల్లుతుంది.}

Options :
1. 14x + 23y - 40 = 0
2. 12x + 17y - 28 = 0
3. \(14x - 29y - 30 = 0\)

4. \(7x - 12y + 15 = 0\)

Question Number : 47  Question Id : 1874633727  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If each line of a pair of lines passing through origin is at a perpendicular distance of 4 units from the point \((3, 4)\), then the equation of the pair of lines is

\[
\begin{align*}
\text{Options:} \\
1. & \quad 7x^2 + 24xy = 0 \\
2. & \quad 7y^2 + 24xy = 0 \\
3. & \quad 7y^2 - 24xy = 0 \\
4. & \quad 7x^2 - 24xy = 0
\end{align*}
\]

Question Number : 48  Question Id : 1874633728  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Variable straight lines \(y = mx + c\) make intercepts on the curve \(y^2 - 4ax = 0\) which subtend a right angle at the origin. Then the point of concurrence of these lines \(y = mx + c\) is

\[
\begin{align*}
\text{Options:} \\
1. & \quad (4a, 0) \\
2. & \quad (2a, 0) \\
3. & \quad (-4a, 0)
\end{align*}
\]
4. \((-2 \alpha, 0)\)

The abscissae of two points P, Q are the roots of the equation \(2x^2 + 4x - 7 = 0\) and their ordinates are the roots of the equation \(3x^2 - 12x - 1 = 0\). Then the centre of the circle with PQ as a diameter is \(P, Q\) యొక్క రేఖపండిత్య యొక్క ఆకృతి యొక్క వెలుగు వైపు అయితే \(2x^2 + 4x - 7 = 0\) యొక్క రేఖాభాగంది సార్లించబడతాయి. మరియు \\(3x^2 - 12x - 1 = 0\) యొక్క రేఖాభాగం సార్లించబడతాయి అయితే \(PQ\) యొక్క మధ్యపట్టు క్రింద ఉండేంది

Options:
1. \((-1, 2)\)
2. \((-2, 6)\)
3. \((1, -2)\)
4. \((2, -6)\)

---

Question Number : 50  Question Id : 1874633730  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the angle between a pair of tangents drawn from a point P to the circle 
\[x^2 + y^2 + 4x - 6y + 9 \sin^2 \alpha + 13 \cos^2 \alpha = 0\] is \(2\alpha\), then the equation of the locus of P is 

\[x^2 + y^2 + 4x - 6y + 9 \sin^2 \alpha + 13 \cos^2 \alpha = 0\]

Options:
1. \[x^2 + y^2 + 4x - 6y + 4 = 0\]
2. \[x^2 + y^2 + 4x - 6y - 9 = 0\]
3. \[x^2 + y^2 - 4x + 6y - 4 = 0\]
4. \[x^2 + y^2 + 4x - 6y + 9 = 0\]
The equation of the circle whose radius is 3 and which touches internally the circle $x^2 + y^2 - 4x - 6y - 12 = 0$ at the point $(-1, -1)$ is

$$x^2 + y^2 - 4x - 6y - 12 = 0 \quad \text{and} \quad (-1, -1) \text{ is the centre in the given circle. The radius is } 3 \text{ cm. Also, it touches internally}$$

Options:

1. $5x^2 + 5y^2 + 9x - 6y - 7 = 0$
2. $5x^2 + 5y^2 - 8x - 14y - 32 = 0$
3. $5x^2 + 5y^2 - 6x + 8y - 8 = 0$
4. $5x^2 + 5y^2 + 6x - 8y - 12 = 0$

Suppose that the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ has its centre on $2x + 3y - 7 = 0$ and cuts the circles $x^2 + y^2 - 4x - 6y + 11 = 0$ and $x^2 + y^2 - 10x - 4y + 21 = 0$ orthogonally. Then $5g - 10f + 3c = \ldots$

Options:

1. 0
2. 1
3. 3
4. 9
If the radical axis of the circles \( x^2 + y^2 + 2gx + 2fy + c = 0 \) and \( 2x^2 + 2y^2 + 3x + 8y + 2c = 0 \) touches the circle \( x^2 + y^2 + 2x + 2y + 1 = 0 \), then \((4g - 3)(f - 2) = \)

\[
x^2 + y^2 + 2gx + 2fy + c = 0 \quad \text{and} \quad 2x^2 + 2y^2 + 3x + 8y + 2c = 0 \quad \text{and} \quad x^2 + y^2 + 2x + 2y + 1 = 0 \quad \text{and} \quad (4g - 3)(f - 2) =
\]

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

---

The parabola \( x^2 = 4ay \) makes an intercept of length \( \sqrt{40} \) units on the line \( y = 1 + 2x \) then a value of \( 4a \) is

\[
x^2 = 4ay \quad \text{point} \quad y = 1 + 2x = \sqrt{40} \quad \text{point} \quad 4a \quad \text{is} \quad \text{required}
\]

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

---

The locus of the points of intersection of perpendicular normals to the parabola \( y^2 = 4ax \) is

\[
y^2 = 4ax \quad \text{point} \quad \text{intersection} \quad \text{normal} \quad \text{point} \quad \text{normal} \quad \text{point} \quad \text{normal} \quad \text{point} \quad \text{normal}
\]

Options:
\( y^2 - 2ax + a^2 = 0 \)
\( y^2 + ax + 2a^2 = 0 \)
\( y^2 - ax + 2a^2 = 0 \)
\( y^2 - ax + 3a^2 = 0 \)

Question Number : 56  Question Id : 1874633736  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

P is a variable point on the ellipse \( \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \) with foci \( F_1 \) and \( F_2 \). If \( A \) is the area of the triangle \( PF_1F_2 \), then the maximum value of \( A \) is

\[ \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ P యొక్క యొక్క తీసిన పై. PF}_1F_2	ext{తొలిపై}

\[ \text{తొలిపై } A \text{ యొక్క, } A \text{ యొక్క } \text{కొంచు వస్తుంది} \]

Options :
1. \( \frac{e}{ab} \)
2. \( \frac{ae}{b} \)
3. \( aeb \)
4. \( \frac{ab}{e} \)
If the line joining the points $A(\alpha)$ and $B(\beta)$ on the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$ is a focal chord, then one possible value of $\cot \frac{\alpha}{2} \cdot \cot \frac{\beta}{2}$ is

$$\frac{x^2}{25} + \frac{y^2}{9} = 1 \implies A(\alpha) \text{ and } B(\beta) \text{ are points on the ellipse.}$$

Thus, $\cot \frac{\alpha}{2} \cdot \cot \frac{\beta}{2}$ is

Options:

1. $-3$
2. $3$
3. $-9$
4. $9$

The equation of a tangent to the hyperbola $16x^2 - 25y^2 - 96x + 100y - 356 = 0$ which makes an angle $45^\circ$ with its transverse axis is

$$16x^2 - 25y^2 - 96x + 100y - 356 = 0$$

which is in the form $Ax^2 - By^2 = 1$ with $A = 16$ and $B = 25$.

Thus, the angle between the $x$-axis and the tangent is $45^\circ$. Therefore, the correct equation is

Options:

1. $x - y + 2 = 0$
2. $x - y + 4 = 0$
3. $x + y + 2 = 0$
4. $x + y + 4 = 0$
If \( P(0, 7, 10) \), \( Q(-1, 6, 6) \) and \( R(-4, 9, 6) \) are three points in the space, then PQR is

\[ P(0, 7, 10), \ Q(-1, 6, 6), \ R(-4, 9, 6) \]  

Options:

1. Right angled isosceles triangle
2. Equilateral triangle
3. Isosceles but not right angled triangle
4. Scalene triangle

---

A(2, 3, 5), B(\( \alpha \), 3, 3) and C(7, 5, \( \beta \)) are the vertices of a triangle. If the median through \( A \) is equally inclined with the co-ordinate axes then \( \cos^{-1}\left(\frac{\alpha}{\beta}\right) = \)

\[ A(2, 3, 5), \ B(\alpha, 3, 3), \ C(7, 5, \beta) \]  

Options:

1. \( \cos^{-1}\left(\frac{-1}{9}\right) \)
2. \( \frac{\pi}{2} \)
The plane $3x + 4y + 6z + 7 = 0$ is rotated about the line $\bar{r} = (\bar{i} + 2\bar{j} - 3\bar{k}) + t(2\bar{i} - 3\bar{j} + \bar{k})$ until the plane passes through origin. The equation of the plane in the new position is

$$3x + 4y + 6z + 7 = 0$$

Options:
1. $x + y + z = 0$
2. $6x + 3y - 4z = 0$
3. $4x - 5y - 2z = 0$
4. $x + 2y + 4z = 0$

If $\lim_{x \to \infty} \left\{ \frac{x^3 + 1}{x^2 + 1} - (\alpha x + \beta) \right\}$ exists and equal to 2 then the ordered pair $(\alpha, \beta)$ of real numbers is

$$\lim_{x \to \infty} \left\{ \frac{x^3 + 1}{x^2 + 1} - (\alpha x + \beta) \right\}$$

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

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

**Question Number : 63  Question Id : 1874633743  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For \(k > 0\),
\[
\sum_{x=0}^{\infty} \frac{k^x}{x!} \lim_{n \to \infty} \frac{n!}{(n-x)!} \left(\frac{1-k}{n}\right)^{n-x} \left(\frac{1}{n}\right)^x = 
\]

\(k > 0\),
\[
\sum_{x=0}^{\infty} \frac{k^x}{x!} \lim_{n \to \infty} \frac{n!}{(n-x)!} \left(\frac{1-k}{n}\right)^{n-x} \left(\frac{1}{n}\right)^x = 
\]

Options :
1. 0
2. \(k\)
3. \(x\)
4. 1

**Question Number : 64  Question Id : 1874633744  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Let \(f: \mathbb{R} \to \mathbb{R}\) be the function defined by
\[
f(x) = \begin{cases} 
5 & \text{if } x \leq 1 \\
a + bx & \text{if } 1 < x < 3 \\
b + 5x & \text{if } 3 \leq x < 5 \\
30 & \text{if } x \geq 5 
\end{cases}
\]

then \(f\) is

\[f: \mathbb{R} \to \mathbb{R} \text{ is continuous and differentiable}\]

\[
f(x) = \begin{cases} 
5 & , x \leq 1 \\
5 + bx & 1 < x < 3 \\
b + 5x & 3 \leq x < 5 \\
20 & , x \geq 5 
\end{cases}
\]

\(\text{is continuous, } f \text{ is} \)
Options:

1. continuous if \( a = 5 \) and \( b = 5 \)
   
   \[ a = 5, \ b = 5 \quad \text{ఐమిది ఐమిదులు} \]

2. continuous if \( a = 0, b = 5 \)
   
   \[ a = 0, \ b = 5 \quad \text{ఐమిది ఐమిదులు} \]

3. continuous if \( a = -5, b = 10 \)
   
   \[ a = -5, \ b = 10 \quad \text{ఐమిది ఐమిదులు} \]

4. not continuous for any values of \( a \) and \( b \)
   
   \[ a, b \in \quad \text{ఐమిది ఐమిదులు} \]

Question Number : 65  Question Id : 1874633745  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Let \([x]\) denote the greatest integer less than or equal to \(x\). Then the number of points where the function \( y = [x] + |1 - x|, \ -1 \leq x \leq 3 \) is not differentiable, is

\[ x \in \quad \text{ఐమిది ఐమిదులు} \quad \text{శాస్త్రిక శాస్త్రికంపు కాంతితో} \quad [x] \quad \text{పించే రేడియాంటియాడు.} \quad \text{ఐమిది} \quad \text{ఐమిదులు} \quad \text{శాస్త్రిక శాస్త్రికంపు కాంతితో} \quad y = [x] + |1 - x|, \ -1 \leq x \leq 3, \quad \text{ఐమిది ఐమిదులు} \quad \text{శాస్త్రిక శాస్త్రికంపు కాంతితో} \quad \text{ఐమిది ఐమిదులు}

Options:

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

Question Number : 66  Question Id : 1874633746  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
If \( \sqrt{1-x^6} + \sqrt{1-y^6} = a(x^3 - y^3) \), then \( y^2 \frac{dy}{dx} = \)

\[
\sqrt{1-x^6} + \sqrt{1-y^6} = a(x^3 - y^3) \quad \text{योग, तब } y^2 \frac{dy}{dx} =
\]

Options:

1. \( \sqrt{1-y^6} \)
2. \( \sqrt{1-x^6} \)
3. \( \sqrt{x \cdot (1-y^6)} \)
4. \( \sqrt{x^2 \cdot (1-x^6)} \)

If \( y = f(x) \) is twice differentiable function such that at a point \( P, \frac{dy}{dx} = 4, \frac{d^2 y}{dx^2} = -3 \), then

\[
\left( \frac{d^2 x}{dy^2} \right)_P =
\]

Options:

1. \( \frac{64}{3} \)
The time $T$ of oscillation of a simple pendulum of length $L$ is governed by $T = 2\pi \sqrt{\frac{L}{g}}$, where $g$ is constant. The percentage by which the length be changed in order to correct an error of loss equal to 2 minutes of time per day is.

Options:

1. $\frac{5}{18}$

2. $\frac{2}{9}$

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

4. $\frac{1}{9}$
Let $A, G, H$ and $S$ respectively denote the arithmetic mean, geometric mean, harmonic mean and the sum of the numbers $a_1, a_2, a_3, ..., a_n$. Then the value of $x$ at which the function $f(x) = \sum_{k=1}^{n} (x - a_k)^2$ has minimum is

Options:
1. $S$
2. $H$
3. $G$
4. $A$

For $m > 1$, $n > 1$, the value of $c$ for which the Rolle’s theorem is applicable for the function $f(x) = x^{2m-1}(a-x)^{2n}$ in $(0, a)$ is

$(0, a)$ లో $m > 1$, $n > 1$ వల్ల $f(x) = x^{2m-1}(a-x)^{2n}$ ఫంక్షన్ లో రొల్లీ విధానం ఎంచుకుంటే $c$ లో యుగుణంపెట్టండి

Options:
1. $\frac{2am - 1}{m + 2n - 1}$
2. $\frac{a(m - n + 1)}{2m + 2n}$
If the function \( f: [-1, 1] \to \mathbb{R} \) defined by
\[
 f(x) = \begin{cases} 
 2^x + 1, & \text{for } x \in [-1, 0) \\
 1, & \text{for } x = 0 \\
 2^x - 1, & \text{for } x \in (0, 1] 
\end{cases}
\]
then, in \([-1, 1]\), \( f(x) \) has

\[
 f: [-1, 1] \to \mathbb{R} \quad \text{\( f(x) = \begin{cases} 
 2^x + 1, & x \in [-1, 0) \\
 1, & x = 0 \\
 2^x - 1, & x \in (0, 1] 
\end{cases}\)}
\]

Options:
1. a maximum
2. a minimum
3. both maximum and minimum
4. neither maximum nor minimum
\[ \int \frac{x-1}{(x+1)\sqrt{x^3 + x^2 + x}} \, dx = \]

Options:

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

If \( I(x) = \int x^2 (\log x)^2 \, dx \) and \( I(1) = 0 \), then \( I(x) = \)

\[ I(x) = \int x^2 (\log x)^2 \, dx, \; I(1) = 0 \Rightarrow \text{Choose } \text{option} \]

Options:

1. \( \frac{x^3}{18} \left[ 8(\log x)^2 - 3\log x \right] + \frac{7}{18} \)
2. \( \frac{x^3}{27} \left[ 9(\log x)^2 + 6\log x \right] - \frac{2}{27} \)
3. \( \frac{x^3}{27} \left[ 9(\log x)^2 - 6\log x + 2 \right] - \frac{2}{27} \)
\[ \frac{x^3}{27} \left[ 9(\log x)^2 - 6\log x - 2 \right] + \frac{2}{27} \]

Question Number : 74  Question Id : 1874633754  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int \frac{x^5 \, dx}{(x^2 + x + 1)(x^6 + 1)(x^4 - x^3 + x - 1)} = \]

Options :

1. \[ \log_e \left| \frac{x^6 - 1}{x^6 + 1} \right| + c \]

2. \[ \frac{1}{12} \log_e \left| \frac{x^6 - 1}{x^6 + 1} \right| + c \]

3. \[ \frac{1}{12} \log_e \left| \frac{x^4 + 1}{x^4 - 1} \right| + c \]

4. \[ \log_e \left| \frac{x^8 + 4}{x^6 - 1} \right| + c \]

---

Question Number : 75  Question Id : 1874633755  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int \frac{dx}{x + \sqrt{x - 1}} = \]

Options :

1. \[ \log_e \left| x + \sqrt{x - 1} \right| - \frac{1}{\sqrt{3}} \tan^{-1} \left( \frac{2\sqrt{x - 1} + 1}{\sqrt{3}} \right) + c \]

2. \[ \frac{1}{\sqrt{3}} \log_e \left| x + \sqrt{x - 1} \right| - \tan^{-1} \left( \frac{2\sqrt{x - 1} + 1}{\sqrt{3}} \right) + c \]
\[ \frac{2}{\sqrt{3}} \log_e \left| x + \sqrt{x - 1} \right| - \tan^{-1} \left( \frac{2\sqrt{x - 1} + 1}{\sqrt{3}} \right) + c \]

\[ \log_e \left| x + \sqrt{x - 1} \right| - \frac{2}{\sqrt{3}} \tan^{-1} \left( \frac{2\sqrt{x - 1} + 1}{\sqrt{3}} \right) + c \]

Question Number : 76  Question Id : 1874633756  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int_{\log_2 e}^{x} \frac{dt}{\sqrt{e^t - 1}} = \frac{\pi}{6} \Rightarrow x = \]

Options :
1. \(2 \cdot \log_2 e\)
2. \(3 \cdot \log_2 e\)
3. \(4 \cdot \log_2 e\)
4. \(8 \cdot \log_2 e\)

Question Number : 77  Question Id : 1874633757  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

\[ \int_{0}^{1} \log_e \left( \frac{1 + x}{1 + x^2} \right) dx = \]

Options :
1. \(\frac{\pi}{4} \log_2 e\)
2. \(\frac{\pi}{6} \log_2 6\)
3. \(\frac{\pi}{2} \log_2 8\)
If the area of the circle \( x^2 + y^2 = 2 \) is divided into two parts by the parabola \( y = x^2 \), then the area (in sq. units) of the larger part is

\[
\frac{\pi}{8} \log_2 2
\]

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

If \( c \) is a parameter, then the differential equation of the family of curves \( x^2 = c(\sqrt{y} + c)^2 \) is

\[
x \left( \frac{dy}{dx} \right)^{\frac{3}{2}} + y \left( \frac{dy}{dx} \right)^{\frac{1}{2}} - 1 = 0
\]

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

3. \[ x \left( \frac{dy}{dx} \right)^3 + y \left( \frac{dy}{dx} \right)^2 + 1 = 0 \]

4. \[ x \left( \frac{dy}{dx} \right)^3 - y \left( \frac{dy}{dx} \right)^2 - 1 = 0 \]

Question Number : 80  Question Id : 1874633760  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If \( f(x), f'(x), f''(x) \) are positive functions and \( f(0) = 1, f'(0) = 2 \), then the solution of the differential equation \( \begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0 \) is

\[ f(x), f'(x), f''(x) \] ఉన్నను, \( f(0) = 1, f'(0) = 2 \) అని అంటే,

\[ \begin{vmatrix} f(x) & f'(x) \\ f'(x) & f''(x) \end{vmatrix} = 0 \] యొక్క సాధనాలు

Options:
1. \( e^{2x} \)
2. \( 2 \sin x + 1 \)
3. \( \sin^2 x + 2x + 1 \)
4. \( e^{4x} \)

Physics
Display Number Panel: Yes
Group All Questions: No
If the charge of electron 'e', mass of electron 'm', speed of light in vacuum 'c' and Planck’s constant 'h' are taken as fundamental quantities, then the permeability of vacuum 'μ₀' can be expressed as

\[
\frac{h}{mc^2}
\]

1.

\[
\frac{hc}{me^2}
\]

2.

\[
\frac{h}{ce^2}
\]

3.

\[
\frac{mc^2}{he^2}
\]

4.

The velocity of an object moving in a straight line path is given as a function of time by \( v = 6t - 3t^2 \), where \( v \) is in \( \text{ms}^{-1} \), \( t \) is in s. The average velocity of the object between \( t = 0 \) and \( t = 2 \) seconds is

\[
\text{Options :}
\]

1. 0

2. 3 \( \text{ms}^{-1} \)
3. 2 ms\(^{-1}\)

4. 4 ms\(^{-1}\)

**Question Number : 83  Question Id : 1874633763  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical**

A gun and a target are at the same horizontal level separated by a distance of 600 m. The bullet is fired from the gun with a velocity of 500 ms\(^{-1}\). In order to hit the target, the gun should be aimed to a height \(h\) above the target. The value of \(h\) is

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

\(\text{accel} \times \text{dis} = \text{vel}^2\)

\(600 \times \frac{1}{2} \times 10 = \frac{500^2}{2 \times 10}\)

\(h = 2.4, 3.6, 7.2, 10.8\)

**Question Number : 84  Question Id : 1874633764  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes Single Line Question Option : No  Option Orientation : Vertical**

A projectile is thrown in the upward direction making an angle of 60° with the horizontal with a velocity of 140 ms\(^{-1}\). Then, the time after which its velocity makes 45° with the horizontal is

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

\(\text{vel} \times \cos 60\° = \frac{140 \times \cos 60\°}{10} = 70\)

\(t = 3.5, 7.0\)

Options :
The maximum value of the applied force $F$ such that the block as shown in the arrangement does not move is

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

\[ \mu = \frac{1}{2\sqrt{3}} \]

Options:

1. 20 N
2. 15 N
3. 25 N
4. 10 N
A rough inclined plane BCE of height \( \left( \frac{25}{6} \right) \) m is kept on a rectangular wooden block ABCD of height 10 m, as shown in the figure. A small block is allowed to slide down from the top E of the inclined plane. The coefficient of kinetic friction between the block and the inclined plane is \( \frac{1}{8} \) and the angle of inclination of the inclined plane is \( \sin^{-1}(0.6) \). If the small block finally reaches the ground at point F, then DF =

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

Options:

1. \( \frac{5}{3} \) m

2. \( \frac{10}{3} \) m

3. \( \frac{13}{3} \) m

4. \( \frac{20}{3} \) m
Two particles P and Q each of mass 3m lie at rest on the X-axis at points \((-a, 0)\) and \((+a, 0)\) respectively. A third particle R of mass 2m initially at the origin moves towards particle Q. If all the collisions of the system of 3 particles are elastic and head-on, the total number of collisions in the system is

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

A motor engine pumps 1800 litre of water per minute from a well of depth 30 m and allows to pass through a pipe of cross sectional area 30 cm$^2$. Then the power of the engine is (Acceleration due to gravity = 10 ms$^{-2}$)

Options:
1. 20.5 kW
2. 15.5 kW
3. 10.5 kW
4. 9.5 kW
A solid sphere of mass 100 kg and radius 10 m moving in a space becomes a circular disc of radius 20 m in one hour. Then the rate of change of moment of inertia in the process is

\[ \frac{40}{9} \text{ kg m}^2 \text{ s}^{-1} \]

\[ \frac{10}{9} \text{ kg m}^2 \text{ s}^{-1} \]

\[ \frac{50}{9} \text{ kg m}^2 \text{ s}^{-1} \]

\[ \frac{25}{9} \text{ kg m}^2 \text{ s}^{-1} \]

A semicircular plate of mass ‘m’ has radius ‘r’ and centre ‘c’. The centre of mass of the plate is at a distance ‘x’ from its centre ‘c’. Its moment of inertia about an axis passing through its centre of mass and perpendicular to its plane is

\[ \frac{1}{2} m r^2 \]
Two bodies of masses $m_1$ and $m_2$ initially at rest at infinite distance apart move towards each other under gravitational force of attraction. Their relative velocity of approach when they are separated by a distance ‘r’ is

\[(G\text{-Universal gravitational constant})\]

Options :

1. \[\left(\frac{2G(m_1 - m_2)}{r}\right)^{\frac{1}{2}}\]

2. \[\left(\frac{2G(m_1 + m_2)}{r}\right)^{\frac{1}{2}}\]

3. \[\left(\frac{r}{2G(m_1m_2)}\right)^{\frac{1}{2}}\]

4. \[\left(\frac{2G}{r^{\frac{1}{2}}m_1m_2}\right)^{\frac{1}{2}}\]
A planet is revolving around the sun as shown in the figure. The radius vectors joining the sun and the planet at points A and B are $90 \times 10^6$ km and $60 \times 10^6$ km respectively. The ratio of velocities of the planet at A and B when its velocities make $30^\circ$ and $60^\circ$ with major axis of the orbit is

\[ \frac{V_B}{V_A} \]

Options:
1. $\frac{3}{2\sqrt{3}}$
2. $\frac{2}{\sqrt{3}}$
3. $\frac{1}{\sqrt{3}}$
4. $\frac{\sqrt{3}}{2}$
A solid copper cube of 7 cm edge is subjected to a hydraulic pressure of 8000 kPa. The volume contraction of the copper cube is
(Bulk modulus of copper = 140 GPa)

7 cm లో ఇది ఉండే విచారం 8000 kPa ప్రజాతి వ్యాప్తి నియమాలు ఉంటాయి. తరువాత వ్యాప్తి నియమాలు అందరిటి
(Bulk modulus of copper = 140 GPa)

Options:
1. $196 \times 10^{-3}$ cm$^3$
2. $19.6 \times 10^{-6}$ cm$^3$
3. $19.6 \times 10^{-3}$ cm$^3$
4. $196 \times 10^3$ cm$^3$

A long cylindrical glass vessel has a pin hole of diameter 0.2 mm at its bottom. The depth to which the vessel can be lowered vertically in a deep water bath without the water entering into the vessel is
(Surface tension of water = 0.07 Nm$^{-1}$, Acceleration due to gravity = 10 ms$^{-2}$)

అ లాంటి తూర్పు వైచరిత్యానికి సమాయంపాట ఉండే 0.2 mm పట్టం నుండి తూర్పు వైచరిత్యానికి సమాయంపాట ఉండే
(నాసకాల = 0.07 Nm$^{-1}$, గ్రాంధాన స్పీడ్ విస్తీర్ణం = 10 ms$^{-2}$)

Options:
1. 14 cm
2. 7 cm
3. 21 cm
4. 28 cm
The focal length of a spherical mirror made of steel is 150 cm. If the temperature of the mirror increases by 200 K, its focal length becomes (coefficient of linear expansion of steel = $12 \times 10^{-6} \, ^\circ C^{-1}$)

Options:
1. 186.3 cm
2. 153.6 cm
3. 150.036 cm
4. 150.36 cm

A metal rod of length 10 cm and area of cross section $2.8 \times 10^{-4} \, m^2$ is covered with a non-conducting substance. One end of it is maintained at 80 °C, while the other end is put in ice at 0 °C. It is found that 20 g of ice melts in 5 min. The thermal conductivity of the metal in $J \, s^{-1} \, m^{-1} \, K^{-1}$ is (Latent heat of ice is 80 cal g$^{-1}$)

Options:
1. 70
2. 80
A gas expands with temperature according to the relation $V = k T^{2/3}$, where $k$ is a constant. Work done when the temperature changes by 60 K is

(R-Universal gas constant)

An ideal gas is taken through the cycle $A \rightarrow B \rightarrow C \rightarrow A$ as shown in the figure. If the net heat supplied to the gas in the cycle is 5 J, the magnitude of work done during the process $C \rightarrow A$ is

![Diagram of a gas cycle](image)

Options:
1. 10 R
2. 20 R
3. 50 R
4. 40 R
The average translational kinetic energy of a molecule in a gas becomes equal to 0.69 eV at a temperature about

\[ \text{Boltzmann constant} = 1.38 \times 10^{-23} \, \text{J K}^{-1} \]

The options are:
1. 3370 °C
2. 3388 °C
3. 5333 °C
4. 5060 °C

An earthquake generates both transverse (S) and longitudinal (P) waves in the earth with speeds 4.5 km s\(^{-1}\) and 8.0 km s\(^{-1}\) respectively. A seismograph records that the first P-wave arrives 3.5 minutes earlier than the first S-wave. From the seismograph, the epicentre of the earthquake is located at a distance

The options are:
An observer moves towards a stationary source of sound with a speed \( \frac{1}{5} \) of the speed of sound. The wavelength and frequency of the waves emitted by the source are ‘\( \lambda \)’ and ‘\( f \)’ respectively. The apparent frequency and wavelength heard by the observer are respectively

Options:
1. \( 1.2 \lambda \)
2. \( f \), \( 1.2 \lambda \)
3. \( 0.8f \), \( 0.8 \lambda \)
4. \( 1.2f \), \( 1.2 \lambda \)
An object is placed 0.1 m in front of a convex lens of focal length 20 cm made of a material of refractive index 1.5. The surface of the lens away from the object is silvered. If the radius of curvature of the silvered surface is 22 cm, then the distance of the final image from the silvered surface is

1.5 విస్తుల నిషిద్ధ తోటం. 20 cm వాంధనంకు వాటి కనుగొని హెచ్చిన 0.1 m పరిమాణం
విస్తుల తోందిని కలిపోతుంది. పరిమాణం అంటే నిషిద్ధ తోటం వాంధనం
తోందిని కలిపోతుంది. తోందిని కలిపోతుంది తోందిని కలిపోతుంది. 22 cm, తోందిని కలిపోతుంది తోందిని కలిపోతుంది

Options:
1. 10 cm
2. 11 cm
3. 12 cm
4. 13 cm

Question Number : 103  Question Id : 1874633783  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In Young’s double slit experiment, if the slit separation is twice the wavelength of light used, then the maximum number of interference maxima is

యంగ్ డ్వెల్స్ ఎక్సెమ్పాన్యం, అయిన పగడ పగడ, వాటి పగడ పగడ పగడ వాటి పగడ
పగడ పగడ పగడ పగడ

Options:
1. 0
2. 3
3. 5
4. 7

Question Number : 104  Question Id : 1874633784  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
Three charges of each magnitude 100 \( \mu \text{C} \) are placed at the corners A, B and C of an equilateral triangle of side 4 m. If the charges at A and C are positive and the charge at point B is negative, then the magnitude of total force acting on charge at ‘C’ and angle made by it with \( \overline{AC} \) are

\[ 100 \, \mu \text{C} \] is \( \overline{AC} \) and \( \text{magnitude} \) is 4 m \( \overline{AC} \) is \( \text{force} \) and \( \text{angle} \) made by it with \( \overline{AC} \). If \( \text{charge at B} \) is negative, then \( \text{charge at A and C} \) is positive. A \( \overline{AC} \) and \( \overline{BC} \) \( \text{forces} \) and \( \text{angle} \) made by it with \( \overline{AC} \). C \( \overline{AC} \) and \( \overline{AC} \) \( \text{forces} \) and \( \text{angle} \) made by it with \( \overline{AC} \). If \( \text{charge at B} \) is negative, then \( \text{charge at A and C} \) is positive.

Options:
1. \( 5.625 \, \text{N, 60}^\circ \)
2. \( 0.5625 \, \text{N, 60}^\circ \)
3. \( 5.625 \, \text{N, 30}^\circ \)
4. \( 0.5625 \, \text{N, 30}^\circ \)
An inclined plane making an angle $30^\circ$ with the horizontal is placed in a uniform horizontal electric field of 100 Vm$^{-1}$ as shown in figure. A small block of mass 1 kg and charge 0.01 C is allowed to slide down from rest from a height $h = 1$ m. If the coefficient of friction is 0.2, then the acceleration of the block is nearly
(Acceleration due to gravity = 10 ms$^{-2}$)

్రేట మాడితాకి 30° రాను చంపడం వంటి నిర్దిష్టం ప్రచురం 100 Vm$^{-1}$ సరైన మాడితాకి భాగం కొనియుండును. 1 kg భాగం మరియు 0.01 C ఐరోపాం రాను చంపడం వంటి హ = 1 m అది చంపడం వంటి ఇండ్యూప్స్ కొనుండా. కంటే కంటే 0.2 ఐరోపాం రాను చంపడం కొనుండా
(అంతర్గత గ్రామాంతర్ = 10 ms$^{-2}$)

Options:
1. 1.3 ms$^{-2}$
2. 2.3 ms$^{-2}$
3. 3.3 ms$^{-2}$
4. 4.3 ms$^{-2}$
A capacitor is made of a flat plate of area $A$ and a second plate of stair-like structure as shown in the figure. The area of each stair is $\frac{A}{3}$ and the height is $d$. The capacitance of the arrangement is

$$C = \epsilon_0 \frac{A}{3d}$$

Options:

1. $\frac{\epsilon_0 A}{3d}$
2. $\frac{6\epsilon_0 A}{11d}$
3. $\frac{3\epsilon_0 A}{d}$
4. $\frac{11\epsilon_0 A}{18d}$
The radius of a soap bubble is $r$ and the surface tension of the soap solution is $S$. The electric potential to which the soap bubble be raised by charging it so that the pressure inside the bubble becomes equal to the pressure outside the bubble is

($\varepsilon_0$ - permittivity of free space)

The ratio of heats generated through shunt and galvanometer is 7:5 when they are connected to make an ammeter. If the resistance of the galvanometer is 112 $\Omega$ then the resistance of the shunt is

### Options:

1. $\sqrt{8 \varepsilon_0}$

2. $\sqrt{4 \varepsilon_0}$

3. $\sqrt{8 \varepsilon_0}$

4. $\sqrt{4 \varepsilon_0}$

1. $80 \ \Omega$

2. $8 \ \Omega$
When an inductor of inductance \( \frac{6}{\pi} \) H, a capacitor of capacitance \( \frac{50}{\pi} \) \( \mu \)F and resistor of resistance \( R \) are connected in series with an ac supply of rms voltage 220 V and frequency 50 Hz, the rms current through the circuit is 440 mA. Match the inductive reactance \((X_L)\), the capacitive reactance \((X_C)\), the resistance \((R)\) and the impedance \((Z)\) of the circuit given in list-I with the corresponding values given in list-II.

<table>
<thead>
<tr>
<th>List - I</th>
<th>List - II</th>
</tr>
</thead>
<tbody>
<tr>
<td>अल्प-1</td>
<td>अल्प-2</td>
</tr>
<tr>
<td>A) ( X_L )</td>
<td>I) 200 ( \Omega )</td>
</tr>
<tr>
<td>B) ( X_C )</td>
<td>II) 300 ( \Omega )</td>
</tr>
<tr>
<td>C) ( R )</td>
<td>III) 500 ( \Omega )</td>
</tr>
<tr>
<td>D) ( Z )</td>
<td>IV) 600 ( \Omega )</td>
</tr>
</tbody>
</table>

The correct answer is

Options:

A  B  C  D  
I  II  I  III
Question Number: 110  Question Id: 187463790  Question Type: MCQ  Option Shuffling: Yes  Display Question Number: Yes  Single Line Question Option: No  Option Orientation: Vertical

Options:

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

2. Both (A) and (R) are correct but (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
If only \( \frac{1}{51} \) of the main current is to be passed through a galvanometer then the shunt required is \( R_1 \) and if only \( \frac{1}{11} \) of the main voltage is to be developed across the galvanometer, then the resistance required is \( R_2 \). Then \( \frac{R_2}{R_1} = \) 

Options:

1. \( \frac{1}{500} \)
2. \( \frac{50}{9} \)
3. \( \frac{500}{3} \)
4. 500
The magnetic field at the centre $C$ of the arrangement shown in figure is

\[ \frac{\mu_0 i}{2\pi r} (1 + \pi) \]

1. \[ \frac{\mu_0 i}{4\pi r} (1 + \pi) \]
2. \[ \frac{\mu_0 i}{\pi r} (1 + \pi) \]
3. \[ \frac{\mu_0 i}{r} (1 + \pi) \]

To measure a magnetic field between the magnetic poles of a loud speaker, a small coil having 30 turns and 2.5 cm$^2$ area is placed perpendicular to the field and removed immediately. If the total charge flown through the coil is $7.5 \times 10^{-3}$ C, and the total resistance of wire and galvanometer is 0.3 $\Omega$, then the magnitude of the magnetic field is

\[ \text{mag} \]

4. \[ \text{mag} \]

Options:
Question Number : 114  Question Id : 1874633794  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In an oscillating LC circuit, the maximum charge on the capacitor is $Q$. The charge on the capacitor when the energy is stored equally between the electric and magnetic fields is

\[ \frac{Q}{2} \]

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

\[ Q \]

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

Options:

Question Number : 115  Question Id : 1874633795  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

An electromagnetic wave of frequency $1 \times 10^{14} \, \text{Hz}$ is propagating along Z-axis. The amplitude of electric field is 4 Vm$^{-1}$, then energy density of electric field will be

(Permittivity of force space $= 8.8 \times 10^{-12} \, \text{C}^2 \, \text{N}^{-1} \, \text{m}^{-2}$)

$1 \times 10^{14} \, \text{Hz}$ బాయిసమ్మతి లేదా శతాబ్ది సహా వాయును ప్రతిపాదించుకోనం మాదిరి Z-అక్షానికి మద్దతము. వాయు ప్రత్యేకం మాదిరి 4 Vm$^{-1}$, వాయు ప్రత్యేకం మాదిరి తిరిగుల, శతాబ్ది

(ప్రత్యేకం సమస్యలు పంపబడుతున్నాయి $= 8.8 \times 10^{-12} \, \text{C}^2 \, \text{N}^{-1} \, \text{m}^{-2}$)
In a photoelectric experiment, a monochromatic light is incident on the emitter plate E, as shown in the figure. When switch $S_1$ is closed and switch $S_2$ is open, the photoelectrons strike the collector plate C with a maximum kinetic energy of 1 eV. If switch $S_1$ is open and switch $S_2$ is closed and the frequency of the incident light is doubled, the photoelectrons strike the collector plate with a maximum kinetic energy of 20 eV. The threshold wavelength of the emitter plate is

Options:
1. $35.2 \times 10^{-13}$ J m$^{-3}$
2. $70.4 \times 10^{-13}$ J m$^{-3}$
3. $70.4 \times 10^{-12}$ J m$^{-3}$
4. $35.2 \times 10^{-12}$ J m$^{-3}$
3. 4166.7 Å
4. 5336.7 Å

In a system, a particle A of mass $m$ and charge $-2q$ is moving in the nearest orbit around a very heavy particle B having charge $+q$. Assuming Bohr’s model of the atom to be applicable to this system, the orbital angular velocity of the particle A is

$$\frac{2\pi m^2 q^2}{\varepsilon_0 h^4}$$

Options:
1. $\frac{3\pi m^3 q^2}{\varepsilon_0 h^2}$
2. $\frac{2\pi m q^4}{\varepsilon_0 h^3}$
3. $\frac{5\pi m^2 q^3}{\varepsilon_0 h^2}$

Question Number : 118  Question Id : 1874633798  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In a nuclear reactor the activity of a radioactive substance is 2000/s. If the mean life of the products is 50 minutes, then in the steady power generation, the number of radio nuclides is $

Options:
1. $12 \times 10^5$

In a p-type semiconductor the donor level is at 50 meV above the valence band. To produce one electron, the maximum wavelength of light photon required is 
(Planck's constant = $6.6 \times 10^{-34}$ J-s and speed of light in vacuum = $3 \times 10^8$ ms$^{-1}$)

Options:
1. 0.0248 µm
2. 0.248 µm
3. 2.48 µm
4. 24.8 µm

A signal of frequency 10 kHz and peak voltage 10 V is used to amplitude modulate a carrier of frequency 1 MHz and peak voltage 20 V. The side band frequencies in kHz are

Options:
1. 1010, 990
2. 910, 1090
3. 10, 11
4. 1.01, 0.99

Chemistry

Display Number Panel: Yes
Group All Questions: No

Question Number: 121 Question Id: 1874633801 Question Type: MCQ Option Shuffling: Yes Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

The wavelength of a microscopic particle of mass $9.1 \times 10^{-31}$ kg is 182 nm, its kinetic energy in J is

$$\text{\textit{h}} = 6.625 \times 10^{-34} \text{ J s}$$

$$\frac{9.1 \times 10^{-31} \text{ kg}}{\text{\textit{h}}} = \frac{182 \text{ nm}}{\text{\textit{h}}} = \frac{182 \text{ nm}}{6.625 \times 10^{-34} \text{ J s}}$$

Options:
1. $7.28 \times 10^{-23}$
2. $7.28 \times 10^{-24}$
3. $3.64 \times 10^{-23}$
4. $3.64 \times 10^{-24}$

Question Number: 122 Question Id: 1874633802 Question Type: MCQ Option Shuffling: Yes Display Question Number: Yes Single Line Question Option: No Option Orientation: Vertical

The energy of an electron in an orbit of hydrogen like ion with an orbit radius of 52.9 pm in J is (ground state energy of electron in hydrogen atom is $-2.18 \times 10^{-18}$ J)

$$-\frac{\text{\textit{E}}}{\text{\textit{h}}} = \frac{52.9 \text{ pm}}{\text{\textit{h}}}$$

$$-\frac{\text{\textit{E}}}{\text{\textit{h}}} = \frac{-2.18 \times 10^{-18} \text{ J}}{6.625 \times 10^{-34} \text{ J s}}$$

(ground state energy of hydrogen atom in J = $-2.18 \times 10^{-18}$ J)
1. \(-4.36 \times 10^{-18}\)

2. \(-1.09 \times 10^{-17}\)

3. \(-8.72 \times 10^{-18}\)

4. \(-6.54 \times 10^{-18}\)

Question Number : 123  Question Id : 1874633803  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

In which of the following the electron gain enthalpy of elements is correctly arranged?

Options :
1. \(S > Se > Te > O\)

2. \(F > Cl > Br > I\)

3. \(Na > Li > K > Rb\)

4. \(O > S > Se > Te\)

Question Number : 124  Question Id : 1874633804  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Which of the following orders are correct against the property given?

I) Dipole moment : \(NF_3 > NH_3 > BF_3\)

II) Covalent bond length : \(C - O > N - O > O - H\)

III) Bond order : \(C_2 > B_2 > He_2\)

Options :
Question Number : 125  Question Id : 1874633805  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The molecule/ion having diamagnetic nature and a bond order of 1.0 is

Options:
1. He₂⁺
2. Li₂⁺
3. B₂
4. C₂

Question Number : 126  Question Id : 1874633806  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

If the kinetic energy of O₂ gas is 4.0 kJ mol⁻¹, its RMS speed in cm s⁻¹ is

Options:
1. 5.0 × 10²
2. 5.0 × 10³
3. 5.0 × 10⁴
4. 5.0 × 10⁻⁴
The volume of 0.02 M acidified permanganate solution required for complete reaction of 60 mL of 0.01 M I\(^-\) ion solution to form I\(_2\) in mL is

60 mL of 0.01 M I\(^-\)  solution is used to produce I\(_2\) up to 0.02 M

Options:
1. 60
2. 20
3. 40
4. 6

6 g of graphite is burnt in a bomb calorimeter at 25 °C and 1 atm pressure. The temperature of water increased from 25 °C to 31 °C. If ΔH of this reaction is \(-248\) kJ mol\(^{-1}\), find out \(C_v\) (in kJ K\(^{-1}\)) of bomb calorimeter.

25 °C 1 atm 6 g of graphite 6 g of graphite of 25 °C 25 °C 31 °C 31 °C 248 kJ mol\(^{-1}\) \(C_v\) (kJ K\(^{-1}\) mol\(^{-1}\))

Options:
1. 20.667
2. 41.33
3. 1488
4. 0.145
In which of the following, the solubility of AgCl will be minimum?

మీదుగా దీనిలో ఎదురు AgCl సా�:@ిసిత్పించడానికి మినమం ఉండటం చాలా?

Options:
1. 0.1 M KNO₃
2. 0.1 M KCl
3. 0.2 M KNO₃
4. Water

The number of species of the following that can act both as Bronsted acids and bases is

మీదుగా ప్రతికంలో ఎంత పరిమితి బ్రానస్టెడ్ ఎక్సిట్సెండ్స్ మిలించే ఉండటం చాలా?

HCl, ClO₄⁻, -OH, H⁺, H₂O, HSO₄⁻, SO₄²⁻, H₂SO₄, Cl⁻

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

Which one of the following properties has same value for H₂ and D₂?

మీదుగా దీనిలో ఎదురు H₂ మీదుకు D₂ ప్రతికంలో ఎంత పరిమితి ఉండటం చాలా?

Options:
density
1.

enthalpy of bond dissociation
2.

bond length
3.

melting point
4.

Identify the correct statements from the following.
I) Tendency to form halide hydrates gradually increases from Be to Ba down the group.
II) Tendency to form stable super oxides increases from Li to Cs down the group.
III) Low solubility of LiF is due to its high lattice energy.
IV) Solubility of carbonates of group-2 elements increases down the group.

Options:
1. I, II
2. III, IV
3. II, III
4. I, III
Which of the following metals exist in liquid state during summer season?

Options:
1. Ga
2. Al
3. Pb
4. Sn

Formic acid is heated with conc. H₂SO₄ at 100 °C to form A and B. When Fe₂O₃ is heated strongly with B, the products formed are C and D. C can also be obtained by reacting CaCO₃ with dil HCl. What is D?

Options:
1. Fe
2. CO
3. CO₂
4. Fe₃O₄

The non-biodegradable waste formed in fertilizer industries is

Options:
fly ash
1.

carbon monoxide
2.

gypsum
3.

lead
4.

Which one of the following has maximum number of hybrid orbitals?

Options:
1. C₆H₆
2. (CH₃)₄C
3. (CH₃)₂C=O
4. CH₃–CH=CH–CN

In Dumas method one gram of carbon compound gives 50 mL of N₂ at 300 K and 740 mm Hg pressure. If the aqueous tension at 300 K is 15 mm Hg, what is the percentage of nitrogen in it?

Options:
Sodium acetate was electrolysed by Kolbe's method to form two gases A and B at anode. C and D are formed when B is heated with regulated supply of O₂ or air in the presence of (CH₃COO)₂ Mn. C reacts with NaOH to form a salt. A and D are respectively.

Options:
1. CO₂, CH₃COOH
2. CO₂, H₂O
3. C₂H₅, H₂O
4. CO₂, H₂O₂
What are Y and Z in the following reaction sequence?

What are Y and Z in the following reaction sequence?

\[ \text{C}_2\text{H}_4 \xrightarrow{\text{HBr}} \text{W} \xrightarrow{\text{Mg}/\text{dry ether}} \xrightarrow{\text{CO}_2} \xrightarrow{\text{H}_3\text{O}^+} \xrightarrow{\text{Na}/\text{dry ether}} \text{Y} \xrightarrow{\text{Z}} \]

Options:

1. NaOH/CaO \hspace{2cm} \text{CH}_3\text{(CH}_2\text{)_2CH}_3
c

2. NaOH/electrolysis \hspace{2cm} \text{H}_3\text{C-CH}_3
d

3. NaOH/CaO \hspace{2cm} \text{H}_3\text{C-CH}_3
e

4. NaOH/electrolysis \hspace{2cm} \text{CH}_3\text{(CH}_2\text{)_2CH}_3

Question Number : 140  Question Id : 1874633820  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical
At T (K), copper (atomic mass = 63.5 U) has fcc unit cell structure with edge length of x Å. What is the approximate density of Cu in g cm\(^{-3}\) at that temperature?

\(N_A = 6.0 \times 10^{23} \text{ mol}^{-1}\)

\[ T (\text{K}) \quad \text{(atomic mass} \quad 63.5 \text{ U}) \quad \text{fcc unit structure} \quad \text{edge length} \quad x \text{ Å} \quad \text{approx.} \quad \text{density of} \quad \text{Cu} \quad \text{g cm}^{-3} \quad \text{approx.} \quad \text{value?} \quad (N_A = 6.0 \times 10^{23} \text{ mol}^{-1}) \]

**Options:**

1. \(\frac{42.3}{x^3}\)
2. \(\frac{4.23}{x^3}\)
3. \(\frac{423}{x^3}\)
4. \(\frac{212}{x^3}\)

---

The number of moles of solute present in the solutions of I, II and III is respectively.

I) 500 mL of 0.2 M NaOH
II) 200 mL of 0.1 N H\(_2\)SO\(_4\)
III) 6 g of urea in 1 kg of water

---

I, II and III (రాసాయణిక రాళ్ళు) ప్రకారం స్టీలు మాత్రము ఎంతమంది?

I) 500 mL లో 0.2 M NaOH
II) 200 mL లో 0.1 N H\(_2\)SO\(_4\)
III) 1 kg తిన్ని ఎంతగా 6 g ముందు ఎంతమంది?

**Options:**

1. 0.1, 0.01, 0.1
6 g of a mixture of naphthalene \( (C_{10}H_8) \) and anthracene \( (C_{14}H_{10}) \) is dissolved in 300 g of benzene. If the depression in freezing point is 0.70 K, the composition of naphthalene and anthracene in the mixture respectively in g are

(molal depression constant of benzene is 5.1 K kg mol\(^{-1}\))

\[ 6 \text{ g naphthalene} \ (C_{10}H_8) \text{ and anthracene} \ (C_{14}H_{10}) \text{ in 300 g benzene} \text{ gives 0.70 K depression} \text{ in freezing point, therefore} \text{ the ratio in g is} \]

\[ (\text{molal depression constant of benzene is 5.1 K kg mol}^{-1}) \]

Options:
1. 2.60, 3.40
2. 3.40, 2.60
3. 2.90, 3.10
4. 3.10, 2.90
Under which of the following conditions E value of the cell for the cell reaction given is maximum?

\[ \text{Zn(s)} + \text{Cu}^{2+}_{(aq)} \rightleftharpoons \text{Cu(s)} + \text{Zn}^{2+}_{(aq)} \]

\[
\frac{2.303 \text{ RT}}{F} \text{ at } 298 \text{ K} = 0.059 \text{ V}, \quad E^0_{\text{Zn}^{2+}|\text{Zn}} = -0.76 \text{ V}, \quad E^0_{\text{Cu}^{2+}|\text{Cu}} = +0.34 \text{ V}
\]

\[ \text{Zn(ω)} + \text{Cu}^{2+}_{(ω)} \rightleftharpoons \text{Cu(ω)} + \text{Zn}^{2+}_{(ω)} \]

\[
\frac{2.303 \text{ RT}}{F} \text{ at } 298 \text{ K} = 0.059 \text{ V}, \quad E^0_{\text{Zn}^{2+}|\text{Zn}} = -0.76 \text{ V}, \quad E^0_{\text{Cu}^{2+}|\text{Cu}} = +0.34 \text{ V}
\]

Options:

1. \( C_1 = 0.1 \text{ M}, \quad C_2 = 0.01 \text{ M} \)

2. \( C_1 = 0.01 \text{ M}, \quad C_2 = 0.1 \text{ M} \)

3. \( C_1 = 0.1 \text{ M}, \quad C_2 = 0.2 \text{ M} \)

4. \( C_1 = 0.2 \text{ M}, \quad C_2 = 0.1 \text{ M} \)
In the first order thermal decomposition of \( C_2H_5I(g) \rightarrow C_2H_4(g) + HI(g) \) the reactant in the beginning exerts a pressure of 2 bar in a closed vessel at 600 K. If the partial pressure of the reactant is 0.1 bar after 1000 minutes at the same temperature the rate constant in \( \text{min}^{-1} \) is 

\[(\log 2 = 0.30)\]

\[C_2H_5I(g) \rightarrow C_2H_4(g) + HI(g) \] 600 K

\[\text{Partial pressure of reactant} = 2 \text{ bar} \]

\[\text{Partial pressure after 1000 min} = 0.1 \text{ bar} \]

\[(\log 2 = 0.30)\]

Options:

1. \(6.0 \times 10^{-4}\)

2. \(6.0 \times 10^{-3}\)

3. \(3.0 \times 10^{-3}\)

4. \(3.0 \times 10^{-4}\)
Identify the correct statements from the following.

I) Sulphur sol is an example of a multimolecular colloid.
II) Tyndall effect is observed when the diameter of the dispersed particles is not much smaller than the wavelength of the light used.
III) The process of removing a dissolved substance from a colloidal solution by means of diffusion through a suitable membrane is called peptization.
IV) Eosin, gelatin are examples of negatively charged sols.

Options:
1. I, II, III
2. I, II, IV
3. I, III, IV
4. II, III, IV
Which of the following are carbonate ores?
I) Magnetite  
II) Kaolinite  
III) Siderite  
IV) Calamine

What is the correct answer?

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

Which of the following statements is not correct?

Options:
From $\text{SO}_2$ to $\text{TeO}_2$ reducing power decreases
1.

The order of boiling points of hydrides of 16th group elements is
$\text{H}_2\text{~S} < \text{H}_2\text{Se} < \text{H}_2\text{Te} < \text{H}_2\text{O}$
2.
Rhombic sulphur has S\(_8\) molecules while monoclinic sulphur has S\(_6\) molecules.

3. The bond angle in Ozone molecule is 117°.

4. Noble metals like gold and platinum are soluble in which of the following mixtures?

Options:
1. 1:1 mixture of conc. HNO\(_3\) and conc. H\(_2\)SO\(_4\)
2. 1:3 mixture of conc. HCl and conc. HNO\(_3\)
3. 1:3 mixture of conc. HNO\(_3\) and conc. HCl
4. 1:3 mixture of conc. H\(_2\)SO\(_4\) and conc. HCl

Question Number : 149  Question Id : 1874633829  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Identify the set of acidic oxides.

Options :
1. Na\(_2\)O, CaO, BaO
1. ZnO, PbO, BeO

3. CO, NO, N₂O

Mn₂O₇, Cr₂O₃, V₂O₅

Question Number : 150  Question Id : 1874633830  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical
The wavelengths of light absorbed by the complexes

\[
[\text{Ni(H₂O)}₆]^{2+}, [\text{Ni(en)}₃]^{2+}, [\text{Ni(H₂O)}₄en]^{2+}
\]

are \( \lambda_1, \lambda_2, \lambda_3 \) respectively. The correct order of wavelengths is

\[
[\text{Ni(H₂O)}₆]^{2+}, [\text{Ni(en)}₃]^{2+}, [\text{Ni(H₂O)}₄en]^{2+}
\]

Options :
1. \( \lambda_1 > \lambda_2 > \lambda_3 \)
2. \( \lambda_3 > \lambda_2 > \lambda_1 \)
3. \( \lambda_1 > \lambda_3 > \lambda_2 \)
4. \( \lambda_2 > \lambda_3 > \lambda_1 \)

Question Number : 151  Question Id : 1874633831  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes
Single Line Question Option : No  Option Orientation : Vertical
KMnO₄ oxidises \( \text{S}_2\text{O}_3^{2-} \) to \( \text{SO}_4^{2-} \) in medium \( x \) and \( \text{NO}_2^- \) to \( \text{NO}_3^- \) in medium \( y \). \( x \) and \( y \) are respectively.

Options :
1. acidic, basic
   వయం, బిస్టిక్

2. acidic, acidic
   వయం, వయం

3. acidic, neutral
   వయం, దీన్యం

4. neutral, acidic
   దీన్యం, వయం

Question Number : 152  Question Id : 1874633832  Question Type : MCQ  Option Shuffling : Yes  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) Teflon</td>
<td>I) SnCl₂</td>
</tr>
<tr>
<td>B) Anionic polymerisation</td>
<td>II) C₂F₄</td>
</tr>
<tr>
<td>C) Cationic polymerisation</td>
<td>III) Bakelite</td>
</tr>
<tr>
<td>D) Thermosetting polymer</td>
<td>IV) Polystyrene</td>
</tr>
<tr>
<td></td>
<td>V) RLi</td>
</tr>
</tbody>
</table>

The correct answer is

Options:
Identify the correct set of monosaccharides present in sucrose (X), lactose (Y) and maltose (Z).

 الهند (X), హేండ్ (Y), హేండ్ (Z) ఎంచు వాటిని మాఫీటూ కండియాలు కొనసాగం.
Which of the following are broad spectrum antibiotics?

- Penicillin G
- Chloramphenicol
- Ofloxacin
- Ampicillin

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

Arrange the following organic halides in correct order of reactivity towards \( S_{N2} \) displacement.

Options:
1. \( P > Q > R \)
2. $R > P > Q$
3. $P > R > Q$
4. $Q > R > P$

Question Number : 156  Question Id : 1874633836  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The bond angle between C – O and O – H bonds in alcohols is close to

అంటే C – O మధ్యం O – H వంటి ఓట్టా వాటి తండ్రి కోణా ఎక్కడు?

Options :
1. $109^\circ$
2. $120^\circ$
3. $180^\circ$
4. $90^\circ$

Question Number : 157  Question Id : 1874633837  Question Type : MCQ  Option Shuffling : Yes  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Identify $Z$ in the following sequence of reactions.

ఏది ఈ ప్రక్రియ పన్నకు $Z$ మా రాయడా కాకుండా?

\[
\begin{align*}
\text{Br} & \quad \xrightarrow{\text{NaNO}_2/\text{HCl}} \quad 273-278 \text{K} \quad \xrightarrow{\text{C}_2\text{H}_5\text{OH}} \quad \xrightarrow{\text{KMnO}_4/\text{OH}^-} \quad \text{COOH}
\end{align*}
\]

Options :
1.
Identify X, Y, Z in the following reaction sequence.

Identify X, Y, Z in the following reaction sequence.

\[
\text{CH}_3\text{OH} \xrightarrow{\text{i. } \text{CrO}_3\cdot\text{H}_2\text{SO}_4} X \xrightarrow{\text{ii. } \text{SOCl}_2} Y \xrightarrow{Z} \text{O} \quad \text{O}
\]

Options:

1. \(\text{CH}_3\text{Cl}\)  
   \(\text{H}_3\text{CMgBr}\)  
   \(\text{HO} \quad \text{CH} \quad \text{OH}/\bar{\text{OH}}\)

2. \(\text{CH}_3\text{Cl}\)  
   \((\text{CH}_3)_2\text{Cd}\)  
   \(\text{HO} \quad \text{CH} \quad \text{Cl}\)
2-Methyl-2-butene on hydration gave an alcohol X. Isomer of X could be prepared from which of the following?

Options:

1. \[
\begin{align*}
\text{\chem{\leftarrow\rightarrow}} & + \text{Br}_2, \text{H}_2\text{O} \\
\end{align*}
\]

2. \[
\begin{align*}
\text{\chem{\text{\rightarrow}}} & + \text{MgBr}_2, \text{H}_2\text{O/H}^+ \\
\end{align*}
\]

3. \[
\begin{align*}
\text{H} & + \text{MgBr}_2, \text{H}_2\text{O/H}^+ \\
\end{align*}
\]

4. \[
\begin{align*}
\text{\chem{\text{\rightarrow}}} & + \text{MgBr}_2, \text{H}_2\text{O/H}^+ \\
\end{align*}
\]
Acetic acid on heating with $\text{NH}_3$ forms A. When A reacts with LiAlH$_4$ followed by hydrolysis gives B. When B is heated with chloroform in KOH medium gives C. What are B and C respectively?

Options :

1. $\text{CH}_3\text{CONH}_2, \text{CH}_3\text{CH}_2\text{NC}$

2. $\text{CH}_3\text{CH}_2\text{NH}_2, \text{CH}_3\text{CH}_2\text{NC}$

3. $\text{CH}_3\text{CH}_2\text{NH}_2, \text{CH}_3\text{COOH}$

4. $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2, \text{CH}_3\text{CH}_2\text{NC}$