Telangana State Council Higher Education

Notations :

1.Options shown in green color and with ✔ icon are correct.

2.Options shown in red color and with ✖ icon are incorrect.

Question Paper Name :	Engineering English 6th Aug 2021 Shift 2
Subject Name :	Engineering (English)
Creation Date :	2021-08-07 11:20:03
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Calculator :	None
Magnifying Glass Required? :	No
Ruler Required? :	No
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Scratch Pad Required? :	No
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Show Watermark on Console? :	Yes
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Auto Save on Console? :	Yes

Engineering (English)

Group Number :	1
Group Id :	3426048
Group Maximum Duration :	0

Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	160
Is this Group for Examiner? :	No

Mathematics

Section Id :	34260422
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	80
Number of Questions to be attempted :	80
Section Marks :	80
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	34260422
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 3426041121 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f:\mathbb{R}\setminus\{0\}\to\mathbb{R}$ is such that $2f(x)+f\left(\frac{1}{x}\right)=4x$, and $S=\{x\in\mathbb{R}:f(x)=f(-x)\}$, then the number of elements in S is

Options :

1. ✖ 0

2. ✖ 1

3. ✔ 2

4. ✖ at least three

Question Number : 2 Question Id : 3426041122 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If a function $f:(-1,1)\to B(\subseteq \mathbb{R})$ is defined as $f(x)=x+x^2+x^3+.....\infty$, then in order to have the inverse function of f, B =

Options :

1. ✖ $\left(-\infty,\frac{1}{2}\right)$

2. ✔ $\left(\frac{-1}{2},\infty\right)$

3. ✖

$(-1,1)$

$\mathbb{R}$

4. ✖

Question Number : 3 Question Id : 3426041123 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For all natural numbers n, $3\left(5^{2n+1}\right)+2^{3n+1}$ is divisible by

Options :

559

1. ✖

17

2. ✔

19

3. ✖

23

4. ✖

Question Number : 4 Question Id : 3426041124 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A and B are two 3×3 non-singular matrices such that $\text{adj}\,A = |A|B$. If tr(X) denotes the trace of a square matrix X and $C = \begin{bmatrix} 4 & 4 & 7 \\ 3 & -2 & 5 \\ -2 & 3 & 6 \end{bmatrix}$ then, $\sum_{k=1}^{\infty} \text{tr}\left(\frac{1}{3^k}(AB)^k C\right) =$

Options :

1. ✖ 12

2. ✔ 4

3. ✖ 81

4. ✖ ∞ (infinite)

Question Number : 5 Question Id : 3426041125 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $A = \begin{bmatrix} 1 & -4 & 7 \\ 0 & 3 & -5 \\ -2 & 5 & -9 \end{bmatrix}$, $B = \begin{bmatrix} a \\ -b \\ -c \end{bmatrix}$. If A and $[A : B]$ have same rank, then

Options :

1. ✖ $2a+b+c=0$

2. ✔ $a=\frac{b+c}{2}$

3. ✖ $b=\frac{a+c}{2}$

4. ✖ $c=\frac{a+b}{2}$

Question Number : 6 Question Id : 3426041126 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In matrix notation, if the system of equations $\begin{bmatrix}1\\-1\\2\end{bmatrix}\begin{bmatrix}1 & -1 & 2\end{bmatrix}\begin{bmatrix}x\\y\\z\end{bmatrix}=\begin{bmatrix}5\\-5\\10\end{bmatrix}$ has infinite number of solutions, then all these solutions lie on

Options :

1. ✖ a line on XY plane

2. ✔ a plane not parallel to any of the coordinate planes

the YZ plane

3. ✖

the ZX plane

4. ✖

Question Number : 7 Question Id : 3426041127 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $Z = x + iy$ is a complex number and $\sqrt{x^2 - 2x + 8} + (x+4)i = y(2+i)$, then $Z =$

Options :

$\frac{-28}{9} - \frac{16}{9}i$

1. ✖

$-2 + 2i$

2. ✔

$\frac{2}{3} - \frac{2}{3}i$

3. ✖

$\frac{-2}{5} - \frac{2i}{5}$

4. ✖

Question Number : 8 Question Id : 3426041128 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

n is a positive integer and not a multiple of 3. If ω is non real cube root of unity, then $\omega^n + \omega^{2n} =$

Options :

1. -1 ✔

2. 3 ✖

3. -3 ✖

4. 1 ✖

Question Number : 9 Question Id : 3426041129 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If n is a positive integer, then $(1+i)^n \div (1-i)^n = -i$, then n will be of the form

Options :

1. $4k-3, k \in \mathbb{N}$ ✖

$4k-1, k \in \mathbb{N}$

2. ✔

$4k-2, k \in \mathbb{N}$

3. ✖

$4k, k \in \mathbb{N}$

4. ✖

Question Number : 10 Question Id : 3426041130 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Suppose α is minimum value of x^2+bx+5 and β is maximum value of $-x^2+ax+5$. If $[\alpha,\beta]$ is the interval of maximum length for x in which $x^2-10x+24\le 0$, then $a^2b^2=$

Options :

25

1. ✖

16

2. ✔

4

3. ✖

18

4. ✖

Question Number : 11 Question Id : 3426041131 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the minimum value of the quadratic expression x^2+5x-2 is M and it exists at a then $\frac{M}{a}=$

Options :

3.3

1. ✔

$\frac{33}{5}$

2. ✖

2.5

3. ✖

−0.25

4. ✖

Question Number : 12 Question Id : 3426041132 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If α, β, γ are the roots of $x^3 - 3x^2 - 4x + 12 = 0$ then $\sum(\alpha + \beta)^2 =$

Options :

1. ✖ 10

2. ✖ -10

3. ✔ 26

4. ✖ -26

Question Number : 13 Question Id : 3426041133 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\alpha, \beta, \gamma\ (\alpha < \beta < \gamma)$ be roots of $ax^3 + bx^2 + cx + d = 0$ and $u, v, w\ (u < v < w)$ be roots of $ak^3x^3 + bk^2x^2 + ckx + d = 0$. If $\beta^2 = \alpha\gamma$, then

Options :

1. ✖ $v = \dfrac{2vw}{u + w}$

2. ✖

$2v = u + w$

$v^2 = uw$

3. ✔

$v^2 = 2uw$

4. ✖

Question Number : 14 Question Id : 3426041134 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Seven scientists $S_1, S_2, ...S_7$ are invited to deliver one lecture each in a conference. The number of ways all the seven lectures can be arranged such that the lecture of S_1 is prior to that of S_3 and the lecture of S_3 is prior to that of S_7 is

Options :

35

1. ✖

840

2. ✔

720

3. ✖

210

4. ✖

Question Number : 15 Question Id : 3426041135 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

15 girls are seated at a round table. The number of ways of selecting three girls such that all the three are not seated together is

Options :

450

1. ✖

345

2. ✖

390

3. ✖

440

4. ✔

Question Number : 16 Question Id : 3426041136 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the coefficient of x^3 in the binomial expansion of $x^3\left(2\sqrt{3}x^2+\frac{1}{kx}\right)^{12}$ is 880, then $k=$

Options :

1. ✖ $2\sqrt{2}$

2. ✖ $4\sqrt{3}$

3. ✖ $2\sqrt{3}$

4. ✔ $\sqrt{3}$

Question Number : 17 Question Id : 3426041137 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The middle term in the expansion of $\left(4x^3-\frac{15}{4x}\right)^8$ is

Options :

1. ✖ $70(15x)^4$

2. ✖

$1820x^8$

$70(15x^2)^4$

3. ✔

$2560x^4$

4. ✖

Question Number : 18 Question Id : 3426041138 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $5|b| < 2|a|$, then the 4^{th} term in the expansion of $(2a+5b)^{-4}$ is

Options :

$^4C_3\, 2^5\, 5^3\, a^5\, b^3$

1. ✖

$-{}^6C_3 \frac{5^3}{2^7}\frac{b^3}{a^7}$

2. ✔

$-{}^6C_3 \frac{5^4}{2^8}\frac{b^4}{a^8}$

3. ✖

$^4C_3\, 2^4\, 5^4\, a^4\, b^4$

4. ✖

Question Number : 19 Question Id : 3426041139 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The partial fraction decomposition of $\frac{3x+1}{(x-1)^2(x+2)}$ is

Options :

1. $\frac{4}{3}\frac{1}{(x-1)^2}+\frac{5}{9}\frac{1}{(x-1)}+\frac{5}{9}\frac{1}{x+2}$ ✖

2. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{4}{3}\cdot\frac{1}{(x-1)^2}+\frac{2}{x-1}$ ✖

3. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{5}{9}\cdot\frac{1}{x-1}+\frac{4}{3}\cdot\frac{1}{(x-1)^2}$ ✔

4. $\frac{-5}{9}\left(\frac{1}{x+2}\right)+\frac{5}{9}\left(\frac{1}{x-1}\right)+\frac{2}{(x-1)^2}$ ✖

Question Number : 20 Question Id : 3426041140 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 60^\circ \cdot \sin 80^\circ =$$

Options :

1. ✖ $\frac{-3}{16}$

2. ✖ $\frac{5}{16}$

3. ✔ $\frac{3}{16}$

4. ✖ $\frac{-5}{16}$

Question Number : 21 Question Id : 3426041141 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\cos\frac{2\pi}{7} + \cos\frac{4\pi}{7} + \cos\frac{6\pi}{7} + \cos\frac{7\pi}{7} =$$

Options :

1. ✖ $\frac{1}{2}$

2. ✖ 1

3. ✖ $\frac{-1}{2}$

4. ✔ $\frac{-3}{2}$

Question Number : 22 Question Id : 3426041142 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If A is not an integral multiple of $\frac{\pi}{2}$, then cosec 2A + cot 2A =

Options :

1. ✖ $\tan A$

2. ✖ $\cot A + 2\cot 2A$

3. ✔ $\tan A + 2\cot 2A$

$\tan 2A$

4. ✖

Question Number : 23 Question Id : 3426041143 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\cos^4\frac{\pi}{8}+\cos^4\frac{2\pi}{8}+\cos^4\frac{3\pi}{8}+\cos^4\frac{4\pi}{8}+\cos^4\frac{5\pi}{8}+\cos^4\frac{6\pi}{8}+\cos^4\frac{7\pi}{8}+\cos^4\frac{8\pi}{8}=$$

Options :

3

1. ✔

-1

2. ✖

1

3. ✖

4

4. ✖

Question Number : 24 Question Id : 3426041144 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of solutions of the equation $\cos 6x + \cos 4x + \cos 2x = -1$ in $[0, \pi]$ is

Options :

1. ✖ 4

2. ✖ 3

3. ✖ 6

4. ✔ 5

Question Number : 25 Question Id : 3426041145 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$2\,\mathrm{Sin}^{-1}x + \mathrm{Sin}^{-1}\left(2x\sqrt{1-x^2}\right) + 3\,\mathrm{Cos}^{-1}x - \mathrm{Cos}^{-1}\left(4x^3 - 3x\right) =$$

Options :

1. ✖ $4\,\mathrm{Sin}^{-1}x$, when $x \in [-1, 1]$

2. ✔

π, when $x \in \left[-1, -\frac{1}{\sqrt{2}}\right]$

$-\pi$, when $x \in \left[\frac{-1}{2}, \frac{1}{2}\right]$

3. ✖

$4\text{Sin}^{-1}x + 2\text{Cos}^{-1}\left(4x^3 - 3x\right), x \in \left[\frac{1}{\sqrt{2}}, 1\right]$

4. ✖

Question Number : 26 Question Id : 3426041146 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the range of $\text{Sec}^{-1}hx + \text{Cosec}^{-1}hx$ is [a, b), then

Options :

$a = 0, b = 1$

1. ✖

$a = \sqrt{2}, b = \infty$

2. ✖

$a = log(1 + \sqrt{2}), b = \infty$

3. ✔

4. ✖

$a=0,\ b=log(1+\sqrt{2})$

Question Number : 27 Question Id : 3426041147 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\text{In } \Delta ABC,\ \text{if } \frac{1}{a+b}+\frac{1}{c+a}=\frac{3}{a+b+c},\ \text{then } \sin A=$$

Options :

1. ✖ 1

2. ✖ $\frac{1}{2}$

3. ✔ $\frac{\sqrt{3}}{2}$

4. ✖ $\frac{4}{5}$

Question Number : 28 Question Id : 3426041148 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the angles of a triangle ABC are in A.P, then

Options :

1. $c^2 = a^2 + b^2 - ab$ ✖

2. $a^2 = b^2 + c^2 - ac$ ✖

3. $b^2 = a^2 + c^2 - ac$ ✔

4. $b^2 = a^2 + c^2$ ✖

Question Number : 29 Question Id : 3426041149 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In any ΔABC, $\frac{1+\cos(A-B)\cdot\cos C}{1+\cos(A-C)\cdot\cos B} =$

Options :

1. $\frac{a^2+c^2}{b^2+c^2}$ ✖

2. ✖

$$\frac{b^2+c^2}{b^2+a^2}$$

$$\frac{a^2+c^2}{a^2+b^2}$$

3. ✖

$$\frac{a^2+b^2}{a^2+c^2}$$

4. ✔

Question Number : 30 Question Id : 3426041150 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\text{In any } \Delta ABC, \frac{b-c\cos A}{c-b\cos A} =$$

Options :

$$\frac{\sin B}{\sin C}$$

1. ✖

$$\frac{\cos C}{\cos B}$$

2. ✔

3. ✖

$\frac{\cos B}{\cos C}$

$\frac{\sin C}{\sin B}$

4. ✖

Question Number : 31 Question Id : 3426041151 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\vec{a}=2\vec{i}-\vec{j}+2\vec{k}$ and $\vec{b}=3\vec{i}-2\vec{j}-5\vec{k}$ be two vectors. Then the projection vector of $\vec{b}$ on a vector perpendicular to $\vec{a}$ is

Options :

$-\frac{2}{3}\left(2\vec{i}-\vec{j}-2\vec{k}\right)$

1. ✖

$\vec{i}+4\vec{j}+\vec{k}$

2. ✖

$\frac{13}{3}\vec{i}+\frac{4}{3}\vec{j}-\frac{11}{3}\vec{k}$

3. ✖

4. ✔ $\frac{31}{9}\vec{i}-\frac{20}{9}\vec{j}-\frac{41}{9}\vec{k}$

Question Number : 32 Question Id : 3426041152 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $P\vec{i}-2\vec{j}+3\vec{k}, 2\vec{i}+3\vec{j}-4\vec{k}, 4\vec{i}+13\vec{j}-18\vec{k}$ are the position vectors of three collinear points A, B, C respectively, then the vector in the direction of $\overline{AB}$ of length $|P|$ units is

Options :

1. ✖ $\frac{2}{5\sqrt{3}}\left(\vec{i}+5\vec{j}-7\vec{k}\right)$

2. ✖ $\frac{1}{\sqrt{83}}\left(3\vec{i}+5\vec{j}-7\vec{k}\right)$

3. ✖ $\frac{1}{\sqrt{78}}\left(2\vec{i}+5\vec{j}-7\vec{k}\right)$

4. ✔ $\frac{1}{5\sqrt{3}}\left(\vec{i}+5\vec{j}-7\vec{k}\right)$

Question Number : 33 Question Id : 3426041153 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If α, β are scalars and $\vec{r}=(2+\alpha-3\beta)\vec{i}+(\beta-3)\vec{j}+(2\alpha-5\beta-1)\vec{k}$ is equation of a plane, then that equation in Cartesian form is

Options :

1. ✖ $2x+y-z+2=0$

2. ✖ $2x-y-z=8$

3. ✖ $2x-y-z+8=0$

4. ✔ $2x+y-z=2$

Question Number : 34 Question Id : 3426041154 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let $\vec{a}, \vec{b}, \vec{c}$ be three unit vectors such that $\vec{a}\times\left(\vec{b}\times\vec{c}\right)=\frac{1}{2}\vec{b}$. If the angle between $\vec{a}, \vec{b}$ is θ_1 and the angle between $\vec{a}, \vec{c}$ is θ_2, then $\theta_1+\theta_2=$

Options :

1. ✔ $150°$

$180°$

2. ✖

$120°$

3. ✖

$90°$

4. ✖

Question Number : 35 Question Id : 3426041155 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Consider the four points $A(1,-2-1), B(4,0,-3), C(1,2,-1)$ and $D(2,-4-5)$ in space. If $\vec{b}=\overrightarrow{AB}, \vec{c}=\overrightarrow{AC}, \vec{d}=\overrightarrow{AD}$ then $\frac{\left[\vec{b}\times\vec{c}\quad \vec{c}\times\vec{d}\quad \vec{d}\times\vec{b}\right]}{\left[\vec{b}+\vec{c}\quad \vec{c}+\vec{d}\quad \vec{d}+\vec{b}\right]}=$

Options :

40

1. ✖

-40

2. ✖

20

3. ✖

-20

4. ✔

Question Number : 36 Question Id : 3426041156 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $\vec{r}=\vec{b}+t\vec{a}, \vec{r}=\vec{d}+s\vec{c}$ are the two skew lines, then the shortest distance between them is

Options :

Magnitude of vector $\vec{b}\times\vec{d}$

1. ✖

Sum of orthogonal projection of $\vec{b}$ on $\vec{d}$ and projection of $\vec{d}$ on $\vec{b}$

2. ✖

orthogonal projection of $\left(\vec{a}-\vec{c}\right)$ on $\left(\vec{b}\times\vec{d}\right)$

3. ✖

orthogonal projection of $\left(\vec{b}-\vec{d}\right)$ on $\left(\vec{a}\times\vec{c}\right)$

4. ✔

Question Number : 37 Question Id : 3426041157 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a die is rolled 42 times it is so happened that a face having the digit i occurred $2i$ times. The mean deviation from the mean of this discrete frequency distribution is

Options :

1. $\frac{80}{63}$ ✔

2. $\frac{32}{3}$ ✖

3. $\frac{72}{41}$ ✖

4. $\frac{15}{4}$ ✖

Question Number : 38 Question Id : 3426041158 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Let S be the sample space of a random experiment and P be a probability function defined on the power set of S. Two events A and B of the random experiment are called independent if

Options :

1. ✖ $P(A \cap B^c) = P(A).P(B)$

2. ✖ $P(A^c \cap B) = P(A).P(B)$

3. ✔ $P(A^c \cap B^c) = (1-P(A))(1-P(B))$

4. ✖ $P(A \cap B) = P(A).P(B^c)$

Question Number : 39 Question Id : 3426041159 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Three groups of children A, B, and C contains boys and girls as given below. Group A contains 3 girls and one boy, group B contains 2 girls and 2 boys and group C contains 3 boys and 1 girl. One child is selected at random from each group. The probability that the three children selected are 1 girl and 2 boys is

Options :

1. ✖ $\frac{9}{32}$

2. ✖ $\frac{3}{32}$

$\frac{13}{32}$

3. ✔

$\frac{19}{32}$

4. ✖

Question Number : 40 Question Id : 3426041160 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $P(A \cup B) = 0.8$ and $P(A \cap B) = 0.3$, then $P(A^c) + P(B^c) =$

Options :

0.3

1. ✖

0.5

2. ✖

0.7

3. ✖

0.9

4. ✔

Question Number : 41 Question Id : 3426041161 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The probability distribution of a random variable X is given below:

$X = x$	0	1	2	3	4	5	6	7
$P(X = x)$	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$

Then $P(0 < x < 4) =$

Options :

1. $\frac{4}{5}$ ✖

2. $\frac{3}{5}$ ✖

3. $\frac{1}{2}$ ✔

4. $\frac{1}{4}$ ✖

Question Number : 42 Question Id : 3426041162 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

In a poisson distribution, if P(X = 2) is twice P(X=1), then the standard deviation of the distribution is

Options :

1. ✖ 1

2. ✔ 2

3. ✖ 4

4. ✖ 8

Question Number : 43 Question Id : 3426041163 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If $A(2,3)$, $B(3,-2)$ are two fixed points and $P(x, y)$ is a variable point satisfying the condition $|PA - PB| = 2$, then the locus of P is

Options :

1. ✖ $(x+y+1)^2 = 4\left[(x-3)^2 + (y+2)^2\right]$

2. ✖ $(x-5y-2)^2 = 4\left[(x-2)^2+(y-3)^2\right]$

3. ✔ $(x-5y-2)^2 = 4\left[(x-3)^2+(y+2)^2\right]$

4. ✖ $(x+y+1)^2 = 4\left[(x-2)^2+(y-3)^2\right]$

Question Number : 44 Question Id : 3426041164 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The equation of a curve C is transformed to $X^2+Y^2-6X+8Y+21=0$ by the rotation of coordinate axes about the origin through an angle of $\frac{\pi}{4}$ in the positive direction of X-axis. If $ax^2+by^2+cx+dy+e=0$ is the equation of the curve C before the transformation, then $(a+b+c^2+d^2-5e)^2=0$

Options :

1. ✖ 4

2. ✔ 9

3. ✖ 16

25

4. ✖

Question Number : 45 Question Id : 3426041165 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The equation of a given straight line is $\frac{x-x_1}{\cos\theta}=\frac{y-y_1}{\sin\theta}=r$. If the equation of the line perpendicular to the given line and passing through (α,β) is $\frac{x}{a}+\frac{y}{b}=1$ then $\frac{b}{a}=$

Options :

$\mathrm{Tan}\,\theta$

1. ✖

$-\mathrm{Tan}\,\theta$

2. ✖

$Cot\theta$

3. ✔

$-Cot\theta$

4. ✖

Question Number : 46 Question Id : 3426041166 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The origin belongs to a region between the lines $x+2y-5=0$ and $3x-4y+5=0$. The number of points in that region of the form $\left((\alpha-1)^2,\alpha\right),\alpha\in\mathbb{Z}$ is

Options :

1. ✖ Infinite in number

2. ✔ 3

3. ✖ 4

4. ✖ 2

Question Number : 47 Question Id : 3426041167 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $A(1,1)$ be a point. B is the image of A with respect to the line $x+2y+2=0$. If C is the foot of the perpendicular from B on the line $3x+4y-10=0$, then AC =

Options :

1. ✖ $\frac{1}{\sqrt{2}}$

2. ✖ 3

3. ✖ $\sqrt{3}$

4. ✔ 1

Question Number : 48 Question Id : 3426041168 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Image of A(1, –2) with respect to the straight line $L \equiv 2x - 3y + 5 = 0$ is B. The foot of the perpendicular from P(–4, –1) on to the line joining AB is

Options :

1. ✖ $(1, -2)$

2. ✖ $(-3, 4)$

3. ✔ $(-1, 1)$

4. ✖ $(-5, 7)$

Question Number : 49 Question Id : 3426041169 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The numbers α and β are such that one of the lines of $2x^2+\alpha xy+3y^2=0$ coincides with one of the lines of $2x^2+\beta xy-3y^2=0$. If the two lines other than that line are perpendicular, then $|\alpha+\beta|=$

Options :

1. 5 ✖

2. 4 ✖

3. 0 ✖

4. 6 ✔

Question Number : 50 Question Id : 3426041170 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If an angular bisector of the coordinate axes is one of the lines of $x^2+2axy+3y^2=0$, then sum of all possible values of a is

Options :

-1

1. ✖

1

2. ✖

0

3. ✔

-2

4. ✖

Question Number : 51 Question Id : 3426041171 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If α, β are the roots of $x^2+2x-3=0$ and γ, δ are the roots of $y^2-y+4=0$, then the equation of the circle having (α, γ) and (β, δ) as ends of a diameter is

Options :

$x^2+y^2+4x-3y+2=0$

1. ✖

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

2. ✔

$x^2+y^2-3x+4y+1=0$

3. ✖

4. ✖ $x^2+y^2-2x+y-1=0$

Question Number : 52 Question Id : 3426041172 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the inverse point of $(1, 1)$ with respect to the circle $x^2+y^2-4x-6y+12=0$ is (h, k) then $h+k=$

Options :

1. ✔ $\frac{22}{5}$

2. ✖ $\frac{8}{5}$

3. ✖ 2

4. ✖ $\frac{-6}{5}$

Question Number : 53 Question Id : 3426041173 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $hkpq \neq 0$ and the circles $x^2+y^2+2hx+2ky=0$ and $x^2+y^2+2px+2qy=0$ touch each other at the origin, then $hq-pk-\frac{hq}{pk}=$

Options :

1. -1 ✔

2. 0 ✖

3. 1 ✖

4. 2 ✖

Question Number : 54 Question Id : 3426041174 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The locus of the centre of circles passing through (a, b) and cut the circle $x^2+y^2-2x+4y-4=0$ orthogonally is

Options :

1. $(a+1)x+(b+2)y=\frac{a^2+b^2+4}{2}$ ✖

$$(a+1)x+(b-2)y=\frac{a^2+b^2+4}{2}$$

2. ✖

$$(a-1)x+(b+2)y=-\left(\frac{a^2+b^2+4}{2}\right)$$

3. ✔

$$(a-1)x+(b-2)y=\frac{a^2+b^2+4}{2}$$

4. ✖

Question Number : 55 Question Id : 3426041175 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Consider the system of circles $x^2+y^2+2fy+\lambda\left(x^2+y^2+2gx+k\right)=0$, where $g\neq 0, f\neq 0$ and λ a parameter. If A, B are the point circles of this system such that $\angle AOB=\frac{\pi}{2}$, then g^2

Options :

$-k$

1. ✖

$\frac{k}{2}$

2. ✔

3. ✖

0

f^2

4. ✖

Question Number : 56 Question Id : 3426041176 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A $(-2, 3)$ is a fixed point outside the parabola $y^2 = 4ax\ (a > 0)$ and P is a point moving on the parabola. The locus of a point Q which divides AP in the ratio 3 : 2 is a conic. Then focus of that conic is

Options :

1. ✖ $(a, 0)$

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

3. ✔ $\left(\frac{3a-4}{5}, \frac{6}{5}\right)$

4. ✖ $\left(\frac{a}{5}, \frac{3a-4}{5}\right)$

Question Number : 57 Question Id : 3426041177 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The length of the latus rectum of the conic $25[(x-2)^2+(y-3)^2]=(3x-4y+7)^2$ is

Options :

1. $\frac{1}{5}$ ✖

2. $\frac{2}{5}$ ✔

3. $\frac{3}{5}$ ✖

4. $\frac{4}{5}$ ✖

Question Number : 58 Question Id : 3426041178 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The sum of the focal distances of the point $\left(\frac{4}{\sqrt{5}},\frac{3}{\sqrt{5}}\right)$ on the ellipse $9x^2+4y^2=36$ is

Options :

1. ✖ 12

2. ✖ 4

3. ✖ 9

4. ✔ 6

Question Number : 59 Question Id : 3426041179 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If F_1 and F_2 are the foci of the ellipse $16x^2 + 25y^2 = 400$ and P is any point on it, then the value of the product $PF_1 \cdot PF_2$ lie in the interval

Options :

1. ✔ $[16, 25]$

2. ✖ $[0, 16]$

3. ✖ $[25, 400]$

$[0,400]$

4. ✖

Question Number : 60 Question Id : 3426041180 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1(a>b)$ has eccentricity and the length of the latus rectum respectively equal to $\frac{5}{4}$ and 9, then $ab=$

Options :

$12\sqrt{2}$

1. ✖

$18\sqrt{3}$

2. ✖

48

3. ✔

20

4. ✖

Question Number : 61 Question Id : 3426041181 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The ratio in which $B\left(\frac{33}{5},\frac{28}{5},\frac{38}{5}\right)$ divides the line segment joining $A(3,2,4)$ and $C(9,8,10)$ is

Options :

1. ✖ $2:1$

2. ✖ $1:3$

3. ✔ $3:2$

4. ✖ $5:3$

Question Number : 62 Question Id : 3426041182 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

If 1, 2, 3 and −1, 0, 1 are the direction ratios of the rays $\overrightarrow{OA}$ and $\overrightarrow{OB}$ respectively, then the direction cosines of a normal to the plane AOB are

Options :

1. ✖

$\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{-1}{\sqrt{3}}$

2. ✖ $\frac{2}{3}, \frac{-2}{3}, \frac{1}{3}$

3. ✔ $\frac{-1}{\sqrt{6}}, \frac{2}{\sqrt{6}}, \frac{-1}{\sqrt{6}}$

4. ✖ $\frac{-3}{13}, \frac{4}{13}, \frac{12}{13}$

Question Number : 63 Question Id : 3426041183 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If the equation of the plane passing through the point $(2,-3,4)$ and perpendicular to both the planes $2x-3y+5z=2$ and $x+y+2z=3$ is $x+py+qz=r$, then r =

Options :

1. ✔ $\frac{5}{11}$

2. ✖ $\frac{45}{11}$

$$\frac{-1}{11}$$

3. ✖

$$\frac{39}{11}$$

4. ✖

Question Number : 64 Question Id : 3426041184 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If a, b are roots of the equation $px^2+qx+r=0$, then $\lim_{x\to b}\frac{1-\cos 2(px^2+qx+r)}{2(px-pb)^2}=$

Options :

$$\frac{1}{2}(b-a)^2$$

1. ✖

$$(a+b)^2$$

2. ✖

$$\frac{1}{2}$$

3. ✖

$a^2 - 2ab + b^2$

4. ✔

Question Number : 65 Question Id : 3426041185 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $f:\mathbb{R}\to\mathbb{R}$ defined as $f(x)=\dfrac{x^3+2x^2+x+2}{x^2+x-2}$ (when $x\neq -2$) is continuous at $x=-2$, then $f(-2)=$

Options :

1. 5 ✖

2. $\dfrac{-5}{3}$ ✔

3. 2 ✖

4. $\dfrac{3}{5}$ ✖

Question Number : 66 Question Id : 3426041186 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the items given in List-A with those of the items of List-B

List-A		List-B	
A)	$\lvert x\rvert+\lvert x-2\rvert$	I)	Right hand limit does not exist at $x = 2$
B)	Cosec hx	II)	Continuous only for non-zero real values of x
C)	$x-[x]$	III)	Limit is zero for all real x
D)	$\sqrt{2-x}$	IV)	Continuous for all real value of x
		V)	Discontinuous at all integral values of x

The correct match is

Options :

1. ✖

A	B	C	D
I	IV	V	III

2. ✖

A	B	C	D
V	I	II	IV

3. ✔

A	B	C	D
IV	II	V	I

4. ✖

A	B	C	D
III	I	IV	V

Question Number : 67 Question Id : 3426041187 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Suppose $f:\mathbb{R}\to\mathbb{R}$ defined as $f(x)=\begin{cases}[\cos\pi x], & x\le 1\\ 2\{x\}-1, & x>1\end{cases}$, where $[\cdot]$ and $\{\cdot\}$ denote the greatest integer function and the fractional part of x respectively, then at $x=1$

Options :

1. ✔ right derivative is 2

2. ✖ left derivative is 2

3. ✖ right derivative is 0

4. ✖ left derivative is -1

Question Number : 68 Question Id : 3426041188 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $y=\tan(\mathrm{Cos}^{-1}x)$, then $\frac{dy}{dx}=$

Options :

1. ✖ $\frac{-x^2}{\sqrt{1-x^2}}$

2. ✖ $\frac{-1}{\sqrt{1-x^2}}$

3. ✖ $\frac{-1}{x\sqrt{1-x^2}}$

4. ✔ $\frac{-1}{x^2\sqrt{1-x^2}}$

Question Number : 69 Question Id : 3426041189 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If $y=\frac{1}{x}+\cos 2x$, then $\frac{d^2y}{dx^2}=$

Options :

1. ✖ $\frac{2}{x^3}+4y-\frac{4}{x}$

2. ✖

$$4y-\frac{4}{x}-\frac{2}{x^3}$$

$$\frac{2}{x^3}+\frac{4}{x}-4y$$

3. ✔

$$4y-\frac{4}{x}-\frac{1}{x^3}$$

4. ✖

Question Number : 70 Question Id : 3426041190 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\frac{d}{dt}\left(\tan t+t^2\operatorname{cosec} ht\right)$$

Options :

$$\sec^2 t+2t\cot ht-t^2\operatorname{cosec} ht\cot ht$$

1. ✖

$$\sec^2 t+2t\operatorname{cosec} ht-t^2\operatorname{cosec} ht\cot ht$$

2. ✔

$$\sec t+2t\cot ht-t^2\operatorname{cosec} ht\cot ht$$

3. ✖

4. ✖

$\sec^2 t + 2t \operatorname{cosec} ht + t^2 \operatorname{cosec} ht \cot ht$

Question Number : 71 Question Id : 3426041191 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The side of an equilateral triangle is 5 units. In measuring the side, an error of 0.05 units is made. Then the percentage error in measuring the area of the triangle is

Options :

1. ✔ 2

2. ✖ 3

3. ✖ 4

4. ✖ 5

Question Number : 72 Question Id : 3426041192 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The ratio of the length of the subnormal to the square of the length of the subtangent at any point P on the curve $y^2=(2x+1)^3$ is

Options :

1. 27 ✔

2. $\frac{1}{9}$ ✖

3. 9 ✖

4. $\frac{8}{27}$ ✖

Question Number : 73 Question Id : 3426041193 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

If θ is the acute angle between the curves $x^2+y^2=2020\sqrt{2}$ and $x^2-y^2=2020$, then $\frac{\sin\theta+\cos\theta}{\tan\theta}=$

Options :

1. $\sqrt{2}$ ✔

2. ✖ $\frac{3+\sqrt{3}}{2}$

3. ✖ $\frac{3+\sqrt{3}}{4}$

4. ✖ $\frac{3+\sqrt{3}}{6}$

Question Number : 74 Question Id : 3426041194 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$f:[1,3]\to\mathbb{R}$ is a function defined as $f(x)=x^3+ax^2+bx$. If $f(1)-f(3)=0$ and $f'\left(\frac{2\sqrt{3}+1}{\sqrt{3}}\right)=0$. Then, $a-b=$

Options :

1. ✖ 5

2. ✔ -17

3. ✖

$4\sqrt{3}$

$-2\sqrt{3}$

4. ✖

Question Number : 75 Question Id : 3426041195 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Let $\tan^0 x = 1$. If $\int\left(\sum_{k=0}^{7}\tan^k x\right)dx = \sum_{k=1}^{7} A_k \tan^k x + C$, then $\sum_{k=1}^{7} A_k =$

Options :

$\frac{76}{25}$

1. ✖

$\frac{28}{15}$

2. ✔

$\frac{38}{35}$

3. ✖

$\frac{124}{75}$

4. ✖

Question Number : 76 Question Id : 3426041196 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int \sqrt{x^2+x+1}\,dx \times \int \frac{1}{\sqrt{x^2+x+1}}dx =$$

Options :

1. $x+C$ ✖

2. $\left(\frac{2x+1}{4}\sqrt{x^2+x+1}+\frac{3}{8}\text{Sin h}^{-1}\frac{2x+1}{\sqrt{3}}\right)\text{Sin h}^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)+C$ ✔

3. $\frac{2x+1}{2}\text{Sin h}^{-1}\left(\sqrt{x^2+x+1}\right)+\left(\frac{3}{8}\text{Sin h}^{-1}\frac{2x+1}{\sqrt{3}}\right)^2+C$ ✖

4. $\frac{2x+1}{2}\left(\text{Sin h}^{-1}\frac{2x+1}{\sqrt{3}}\right)^2+C$ ✖

Question Number : 77 Question Id : 3426041197 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int \frac{dx}{\sqrt{(5+2x+x^2)^3}} =$$

Options :

1. ✖ $\frac{1}{4}\frac{1}{\sqrt{5+2x+x^2}}+C$

2. ✖ $\frac{1}{\sqrt{5+2x+x^2}}+C$

3. ✖ $\frac{x+1}{\sqrt{5+2x+x^2}}+C$

4. ✔ $\frac{1}{4}\frac{x+1}{\sqrt{5+2x+x^2}}+C$

Question Number : 78 Question Id : 3426041198 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int_0^{\frac{\pi}{2}} \frac{\pi \sin x}{1+\cos^2 x} dx =$$

Options :

1. ✖ π^2

2. ✖ $\frac{\pi^2}{2}$

3. ✔ $\frac{\pi^2}{4}$

4. ✖ $\frac{\pi^2}{6}$

Question Number : 79 Question Id : 3426041199 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

$$\int_0^{\pi} \sqrt{1+4\sin^2\frac{x}{2}+4\sin\frac{x}{2}}\,dx =$$

Options :

1. ✖ π

2. ✖ $\pi+2$

$\pi+4$

3. ✔

0

4. ✖

Question Number : 80 Question Id : 3426041200 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The differential equation for which $y^2 = 4a(x+a)$ (where a is a parameter) is general solution, is

Options :

1. ✔ $y - yy'^2 = 2xy'$

2. ✖ $y + yy'^2 = 2xy'$

3. ✖ $y(y + y') = 2xy'$

4. ✖ $y(y - y') = 2xy'$

Physics

Section Id :	34260423
Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40
Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	34260423
Question Shuffling Allowed :	Yes

Question Number : 81 Question Id : 3426041201 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is NOT a fundamental force in nature?

Options :

1. ✖ Weak Force

2. ✖ Gravity

3. ✔ Friction

4. ✖ Electromagnetic

Question Number : 82 Question Id : 3426041202 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The error in the measurement of the length and the breadth of a rectangular table is 1 %. If the length and breadth of the table are 1 m and 50 cm respectively, then the area of the table including error is

Options :

1. ✖ $(0.5 \pm 0.1)\,m^2$

2. ✔ $(0.5 \pm 0.01)\,m^2$

3. ✖ $(5000 \pm 10)\ cm^2$

4. ✖ $(5000 \pm 1)\ cm^2$

Question Number : 83 Question Id : 3426041203 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A ball is dropped from rest at time t = 0 from certain height. A second ball is dropped from same height at time t = 1 s. At what time t, the distance between two balls becomes 10 m?

Options :

1. ✖

1.25 s

2. ✔ 1.5 s

3. ✖ 1.75 s

4. ✖ 2 s

Question Number : 84 Question Id : 3426041204 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The acceleration of a particle is increasing linearly with time t as 6t. The particle starts from the origin with an initial velocity10m/s. The distance travelled by the particle after 2 seconds will be

Options :

1. ✔ 18 m

2. ✖ 14 m

3. ✖ 22 m

4. ✖ 26 m

Question Number : 85 Question Id : 3426041205 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A man can swim with a speed of 4 kmh^{-1} in still water. How long does he take to cross a river 1 km wide, if the river flows steadily 3 kmh^{-1} and he makes his strokes normal to the river current?

Options :

1. ✖ 30 minutes

2. ✖ 25 minutes

3. ✖ 20 minutes

4. ✔ 15 minutes

Question Number : 86 Question Id : 3426041206 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A projectile object is thrown in the upward direction making an angle of 60° with the horizontal with velocity of 140 m/s. Then the time after which its velocity makes an angle 30° with the horizontal is

(use $g = 10\ m/s^2$)

Options :

1. ✔ $\frac{14}{\sqrt{3}}$ s

$7\sqrt{3}\,s$

2. ✖

$14\sqrt{3}\,s$

3. ✖

$\frac{7}{\sqrt{3}}\,s$

4. ✖

Question Number : 87 Question Id : 3426041207 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In uniform circular motion which of following statement is wrong?

Options :

Work done during one complete cycle is zero

1. ✖

Centripetal force acting towards the centre of circle

2. ✖

Angular velocity is constant

3. ✖

Tangential velocity is constant

4. ✔

Question Number : 88 Question Id : 3426041208 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Imagine a person standing on a weighing machine placed inside an elevator. The elevator first accelerates, then moves with a constant velocity and finally decelerates to stop. The maximum and minimum weight recorded are 80 kg and 64 kg respectively. Find out the true weight of that person considering $g = 10\ m/s^2$.

Options :

1. ✖ 70 kg

2. ✖ 85 kg

3. ✔ 72 kg

4. ✖ 65 kg

Question Number : 89 Question Id : 3426041209 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A force acts on a body of mass 15 kg, initially at rest. If the instantaneous power due to the force at the end of the third second is 5 W then the instantaneous power (in W) at the end of the fourth second will be

Options :

1. ✖ 6.33

2. ✔ 6.67

3. ✖ 6.29

4. ✖ 6.94

Question Number : 90 Question Id : 3426041210 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A ball of mass 2 kg is moving in xy plane with a potential energy given as $U = (12x + 16y)$ J, x and y being in metre. Assume the initial position of the ball at t = 0 is at origin (0, 0) and it is moving with a velocity of $\left(15\hat{i} + 20\hat{j}\right)$ m/s. Then identify the correct statement.

Options :

1. ✖ The path of the ball is parabolic

2. ✖ The direction of motion of the ball initially at t = 0 is parallel to the direction of acceleration

3. ✔ The speed of the ball at t = 2s is 5 m/s

4. The magnitude of acceleration of the ball is $8\ m/s^2$ ✖

Question Number : 91 Question Id : 3426041211 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A particle is moving in a circle of radius 5 cm with uniform speed and completes the circle in 5 s. What is the magnitude of linear acceleration?

Options :

1. $0.8\pi^2\ cm/s^2$ ✔

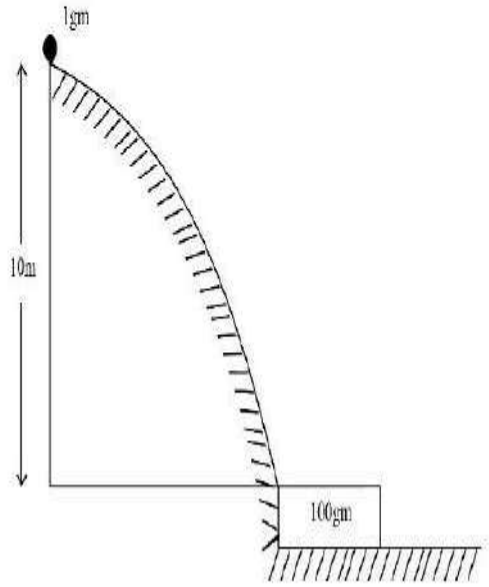
2. $0.8\pi^2\ m/s^2$ ✖

3. $0.8\pi\ cm/s^2$ ✖

4. $0.8\pi\ m/s^2$ ✖

Question Number : 92 Question Id : 3426041212 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A small disc of mass 1 gm slides down a smooth hill of height 10 m from rest and gets on to a plank of mass 100 gm as shown in the figure. Due to friction between the disc and the plank, the disc slows down and moves as one piece with the plank. The work done by the frictional force is approximately
(Use $g = 10\ m/s^2$)



Options :

1. ✖ 0.01 J

2. ✖ 10 J

3. ✔ 0.1 J

4. ✖ 1 J

Question Number : 93 Question Id : 3426041213 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two particles execute simple harmonic motion (SHM) along close parallel lines. SHM of the both the particles have same frequency and same amplitude. When they pass each other moving in opposite direction each time, their displacement is half their amplitude. Then their phase difference is

Options :

1. ✖ 0

2. ✔ $2\pi/3$

3. ✖ $\pi/3$

4. ✖ $\pi/2$

Question Number : 94 Question Id : 3426041214 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

Column-1		Column-2	
A)	Potential energy of satellite	I)	Positive
B)	Total energy of satellite	II)	Negative
C)	Kinetic energy of satellite	III)	Zero
D)	Gravitational potential energy of satellite at infinity	IV)	Infinity

The correct match is

Options :

1. ✖

A	B	C	D
IV	II	I	III

2. ✖

A	B	C	D
III	I	IV	II

3. ✔

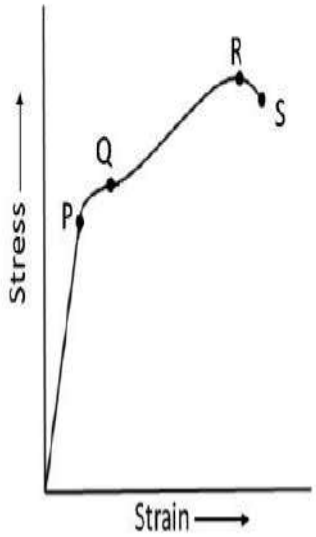
A	B	C	D
II	II	I	III

4. ✖

A	B	C	D
II	I	IV	III

Question Number : 95 Question Id : 3426041215 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The graph below represents a typical stress-strain curve for a metal. Identify the point on the graph that is the ultimate tensile strength of the material.



Options :

1. P ✖

2. Q ✖

3. R ✔

4. S ✖

Question Number : 96 Question Id : 3426041216 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A shower head has 25 circular openings, each with radius 1 mm. The shower head is connected to a pipe with radius 2 cm. If the speed of the water in the pipe is 25 cm/sec, what is its speed as it exits the shower head openings?

Options :

1. ✖ 1 m/s

2. ✖ 2 m/s

3. ✔ 4 m/s

4. ✖ 5 m/s

Question Number : 97 Question Id : 3426041217 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A block of material with density 3 gm/cc is placed on a fluid of density 7 gm/cc. The fraction of volume of the piece of material outside the fluid is

Options :

1. ✖ 0.43

2. ✔ 0.57

3. ✖ 0.63

4. ✖ 0.15

Question Number : 98 Question Id : 3426041218 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The radiated power of a body at 400 K is 1000 W. If the temperature is raised to 800 K, what would be the radiated power of the body?

Options :

1. ✖ 12000 W

2. ✖ 15000 W

3. ✔ 16000 W

4. ✖ 18000 W

Question Number : 99 Question Id : 3426041219 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A metal ball of mass 1 kg is heated using a 40 W heater in a room at 30°C. The temperature of the ball becomes steady at 70°C. Assuming Newton's law of cooling, the rate of loss of heat to the surrounding when the ball is at 40°C is

Options :

1. ✖ 20 W

2. ✖ 5 W

3. ✖ 25 W

4. ✔ 10 W

Question Number : 100 Question Id : 3426041220 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A cylinder consists of a gas mixture of Helium and Oxygen. If the mass of Helium is 4 gm and the mass of oxygen is 32 gm, then the ratio of specific heat of the mixture (Cp/Cv)

Options :

1. ✖ 2/3

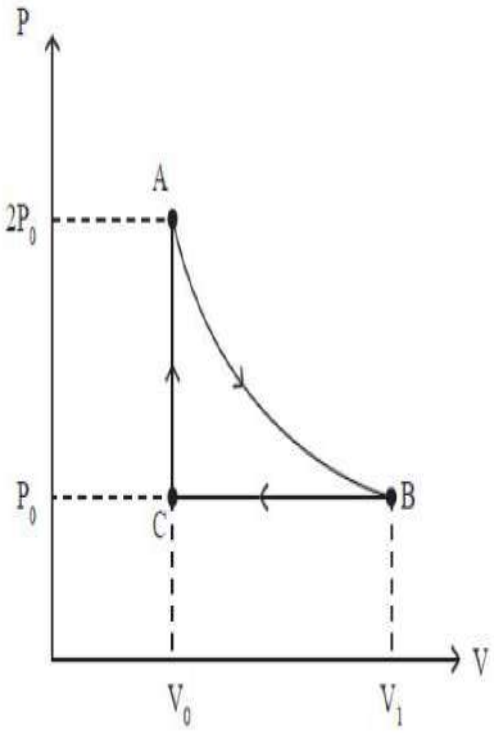
2. ✔ 3/2

3. ✖ $1/2$

4. ✖ $1/3$

Question Number : 101 Question Id : 3426041221 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

An ideal gas goes through a process $A \rightarrow B \rightarrow C \rightarrow A$ cycle. The process $A \rightarrow B$ is adiabatic. Calculate the work done in the process $A \rightarrow B$.



Options :

1. ✖ P_0V_0

2. ✔

$$\frac{P_0V_0\left(2^{1/\gamma}-2\right)}{(1-\gamma)}$$

3. ✖ $P_0V_0\ln(2)$

4. ✖ $\frac{P_0V_0\left(2^{1/\gamma}-1\right)}{(\gamma-1)}$

Question Number : 102 Question Id : 3426041222 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The temperature at which the r.m.s speed of molecules in hydrogen gas will be double of its initial value at 27°C is

Options :

1. ✖ 300°C

2. ✖ 1473°C

3. ✔ 927°C

4. ✖ 546°C

Question Number : 103 Question Id : 3426041223 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Two identical wires have a fundamental frequency f_0 when kept under the same tension T. If the tension of one wire is increased by ΔT, then the N beats/s occur when both wires oscillate simultaneously. The correct statement is

Options :

1. ✔ $\frac{\Delta T}{T}=\left(\frac{f_0+N}{f_0}\right)^2-1$

2. ✖ $\frac{\Delta T}{T}=\left(\frac{f_0}{f_0-N}\right)^2-1$

3. ✖ $\frac{\Delta T}{T}=\left(\frac{f_0-N}{f_0}\right)^2+1$

4. ✖ $\frac{\Delta T}{T}=\left(\frac{f_0+N}{f_0}\right)^2$

Question Number : 104 Question Id : 3426041224 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The focal length of a biconvex lens made of glass, of equal radii is f. If the lens is dipped in the water then the focal length becomes.

(Take refractive index of glass and water as $\frac{3}{2}$ and $\frac{4}{3}$, respectively)

Options :

1. ✖ $2f$

2. ✔ $4f$

3. ✖ $(5/3)f$

4. ✖ $(7/4)f$

Question Number : 105 Question Id : 3426041225 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

White light is used to illuminate the two slits in a Young's double experiment. The observed central fringe is

Options :

1. ✖ Black

2. ✔ White

3. ✖ Blue

4. ✖ Red

Question Number : 106 Question Id : 3426041226 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A circular wire–loop of radius 1 cm carries a total charge 1×10^{-6} C distributed uniformly over its length. If 0.01 % of its length (circumference) is cut-off, then the electric field at the centre of the loop due to the remaining wire is

(Take $\frac{1}{4\pi\varepsilon_0}=9\times10^9$ SI unit)

Options :

1. ✖ 3×10^3 N/C

2. ✖ 6×10^3 N/C

3. ✔ 9×10^3 N/C

4. ✖ 1.2×10^2 N/C

Question Number : 107 Question Id : 3426041227 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A hollow metal sphere of radius 15 cm is charged such that potential on its surface is 20 V. Then the potential at the centre of sphere is

Options :

1. ✖ 0 V

2. ✔ 20 V

3. ✖ 10 V

4. ✖ 15 V

Question Number : 108 Question Id : 3426041228 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Consider a wire of length L with a resistance of 5 Ω . Applying an external force, the wire is elongated such that its length becomes 3 L. Assuming the resistivity and density of the material is unchanged, the resistance of the elongated wire is,

Options :

1. ✖ 40 Ω

2. ✔ 45 Ω

3. ✖ $50\ \Omega$

4. ✖ $48\ \Omega$

Question Number : 109 Question Id : 3426041229 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

When a metal rod of length ℓ is placed in a magnetic field $\vec{B}$ and moved with velocity V perpendicular to the field, then the induced *emf* across its ends is

Options :

1. ✔ $B\ell V$

2. ✖ $\frac{B\ell}{V}$

3. ✖ $\frac{V}{B\ell}$

4. ✖ $eB\ell$

Question Number : 110 Question Id : 3426041230 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

A coil having 2000 turns is wound tightly in the form of a spiral with inner and outer radii 1 cm and 3 cm respectively. When a current $\frac{1}{\pi}$ mA passes through the coil the magnetic field at the centre is calculated to be $K \ln 3 \times 10^{-6}$ T. The value of K is

Options :

1. ✔ 20

2. ✖ 10

3. ✖ 15

4. ✖ 25

Question Number : 111 Question Id : 3426041231 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

The direction of Earth's magnetic field at the magnetic poles is

Options :

1. ✔ Purely vertical

2. ✖ Purely horizontal

45° between horizontal and vertical

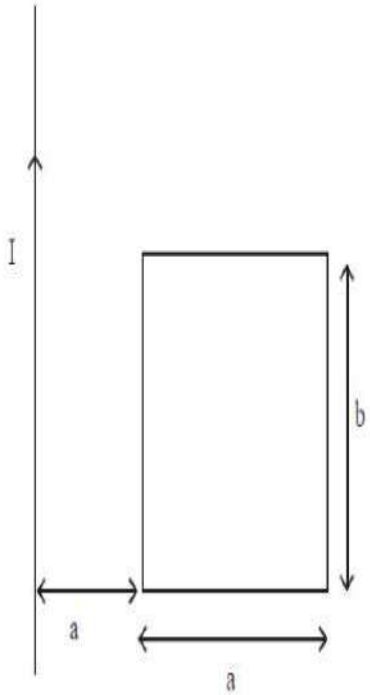
3. ✖

30° to vertical

4. ✖

Question Number : 112 Question Id : 3426041232 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A long straight wire carrying current I and a rectangular frame with side lengths a and b lie in the same plane as shown in the figure. The mutual inductance of the wire and frame is



Options :

$\frac{\mu_0}{2\pi} ab$

1. ✖

2. ✖

$\frac{\mu}{4\pi}\frac{b}{a}$

3. ✖ $\frac{\mu_0 a}{2\pi}\ln 2$

4. ✔ $\frac{\mu_0 b}{2\pi}\ln 2$

Question Number : 113 Question Id : 3426041233 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A resistor $R = 300\ \Omega$ and a capacitor $C = 25\,\mu f$ are connected in series with a 50 V, $\frac{50}{\pi}$ Hz AC source. The average power dissipated in the circuit is

Options :

1. ✖ 0.5 W

2. ✖ 1.0 W

3. ✖ 2.0 W

4. ✔ 1.5 W

Question Number : 114 Question Id : 3426041234 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A radiation of energy E falls normally on a perfectly reflecting surface. The momentum transferred to the surface is
(c is velocity of light)

Options :

1. ✖ Ec

2. ✖ E/c

3. ✔ $2E/c$

4. ✖ E/c^2

Question Number : 115 Question Id : 3426041235 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In a photoelectric effect experiment the cathode metal is exposed to light of wavelength 600 nm. The maximum kinetic energy of the ejected electron doubles when light of wavelength 400 nm is used. The work function of the cathode metal is approximately
[Use $h = 6.63 \times 10^{-34}$ J.s, $c = 3 \times 10^{8}$ m/s]

Options :

1. ✖

1.58 eV

2. ✖ 1.84 eV

3. ✔ 1.02 eV

4. ✖ 2.64 eV

Question Number : 116 Question Id : 3426041236 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In hydrogen atom spectra, if the ratio of wavelengths corresponding to the first of Lyman series and the first line of Balmer series is 9α, the value of α is

Options :

1. ✖ 0.5

2. ✖ 0.8

3. ✔ 0.6

4. ✖ 0.4

Question Number : 117 Question Id : 3426041237 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which one of the following statement is correct?

Options :

1. ✔ The mass of the nucleus must be less than the sum of the masses of the constituent neutrons and protons.

2. ✖ The mass of the nucleus must be equal to the sum of the masses of the constituent neutrons and protons.

3. ✖ The mass of the nucleus must be greater than the sum of the masses of the constituent neutrons and protons.

4. ✖ The mass of the nucleus must be equal to only the masses of the constituent neutrons or protons.

Question Number : 118 Question Id : 3426041238 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

What is the maximum wavelength of electromagnetic radiation that create a electron-hole pair in material with band gap 0.7 eV? Planck's constant 4.136×10^{-15} eV-Sec, velocity of light $= 3 \times 10^{8}$ m/s.

Options :

1. $1773 \times 10^{-8}\,\mathrm{m}$ ✖

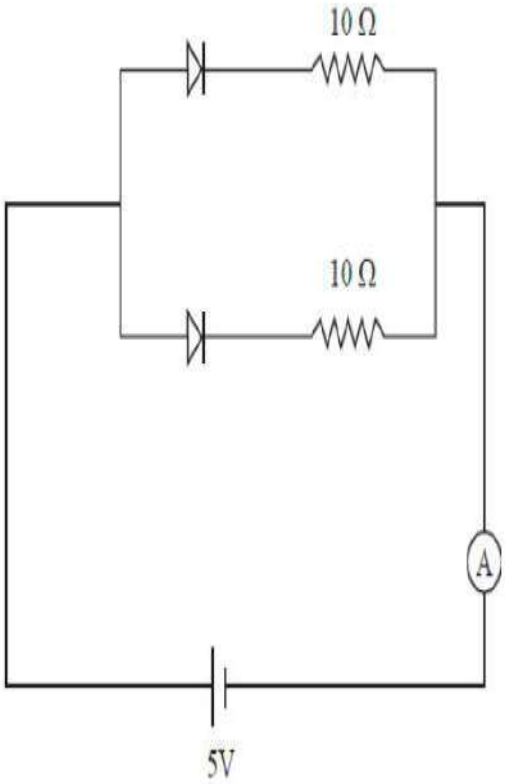
2. $1773 \times 10^{-9}\,\mathrm{m}$ ✔

3. $1873 \times 10^{-9}\,\mathrm{m}$ ✖

4. $1873 \times 10^{-8}\,\mathrm{m}$ ✖

Question Number : 119 Question Id : 3426041239 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The current through the ammeter (neglecting internal resistance) in the following circuit is



Options :

1. ✖ 2 A

2. ✔ 1 A

3. ✖ 0.5 A

4. ✖ 0

Question Number : 120 Question Id : 3426041240 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A TV transmission tower of height h covers a range of distance 'd'. By how much will be the range change if the height is increased to $\frac{3}{2}$h

Options :

1. $\sqrt{\frac{3}{2}}d$ ✖

2. $\left(\sqrt{\frac{3}{2}}-1\right)d$ ✔

3. $\left(\sqrt{\frac{3}{2}}+1\right)d$ ✖

4. d ✖

Chemistry

Section Id :	34260424
Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	40
Number of Questions to be attempted :	40

Section Marks :	40
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	34260424
Question Shuffling Allowed :	Yes

Question Number : 121 Question Id : 3426041241 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Based on the Bohr's theory of hydrogen atom, the speed of the electron, energy of the electron, and the radius of its orbit varies with the principal quantum number, respectively as

Options :

1. ✖ $n\ ;\ n^2;\ n^2$

2. ✖ $\frac{1}{n^2};\frac{1}{n};n$

3. ✖ $\frac{1}{n};\frac{1}{n};n^2$

4. ✔ $\frac{1}{n};\frac{1}{n^2};n^2$

Question Number : 122 Question Id : 3426041242 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The energy (in eV) associated with the electron in the 1^{st} orbit of Li^{2+} is

Options :

1. ✔ -122.4

2. ✖ -61.15

3. ✖ -30.5

4. ✖ -244.6

Question Number : 123 Question Id : 3426041243 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

How many of the following oxides are amphoteric?

$BeO; ZnO; Sb_2O_3; CO; CaO; SO_2; SO_3$

Options :

1. ✖ 2

3

2. ✔

4

3. ✖

5

4. ✖

Question Number : 124 Question Id : 3426041244 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Among the options, the element with highest electron gain enthalpy is

Options :

He

1. ✖

Ne

2. ✔

Kr

3. ✖

Xe

4. ✖

Question Number : 125 Question Id : 3426041245 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

List-I Molecule		List -II Dipole moment (D)	
A)	HBr	I)	1.04
B)	H_2S	II)	0
C)	NH_3	III)	0.79
D)	$CHCl_3$	IV)	0.95
		V)	1.47

The correct match is

Options :

1. ✖

A	B	C	D
I	V	IV	III

2. ✔

A	B	C	D
III	IV	V	I

3. ✖

A	B	C	D
I	V	II	IV

4. ✖

A	B	C	D
IV	V	I	III

Question Number : 126 Question Id : 3426041246 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

	List-I Species		List -II No. of lone pairs
A)	CH_3COCH_3	I)	2
B)	$CH_3C\overset{\oplus}{O}$	II)	0
C)	$C\overset{\oplus}{H}_2CH_3$	III)	1
		IV)	3

The correct match is

Options :

A	B	C
I	I	III

1. ✖

A	B	C
I	III	II

2. ✔

A	B	C
I	IV	III

3. ✖

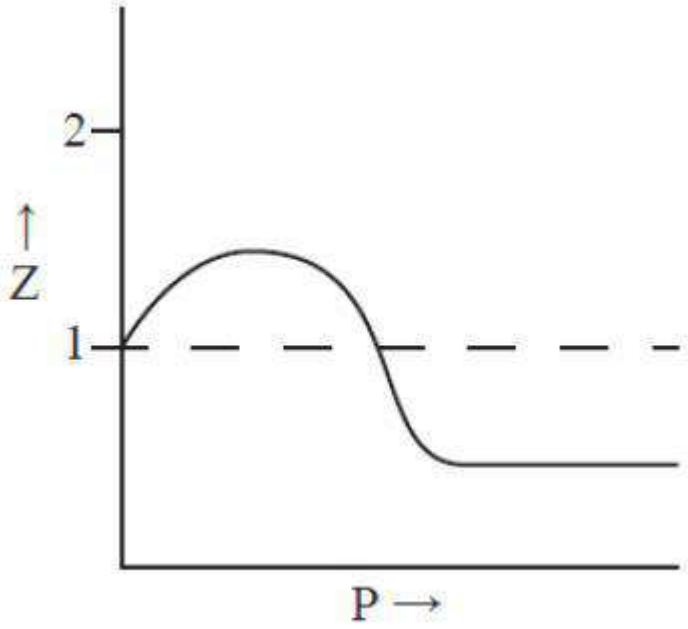
A	B	C
II	II	IV

4. ✖

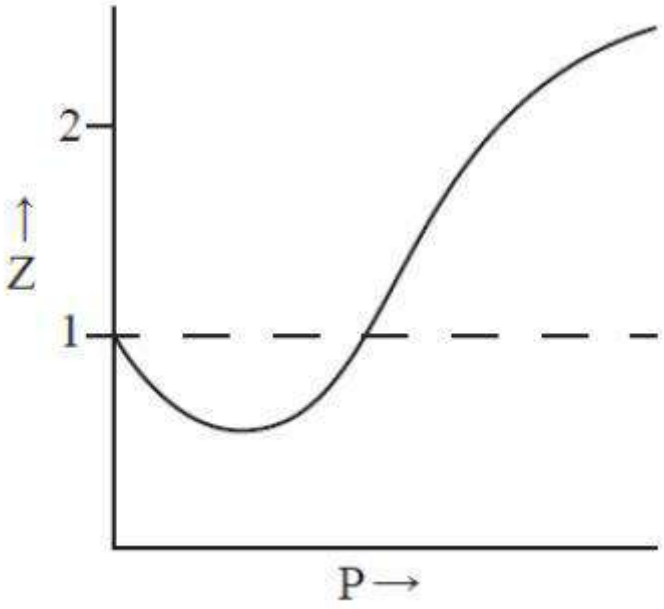
Question Number : 127 Question Id : 3426041247 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

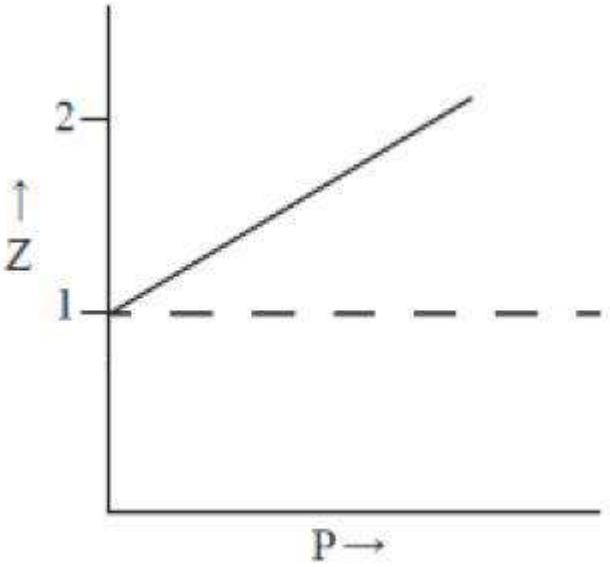
Which of the following indicates a plot of compressibility factor (Z) vs P at room temperature for helium

Options :

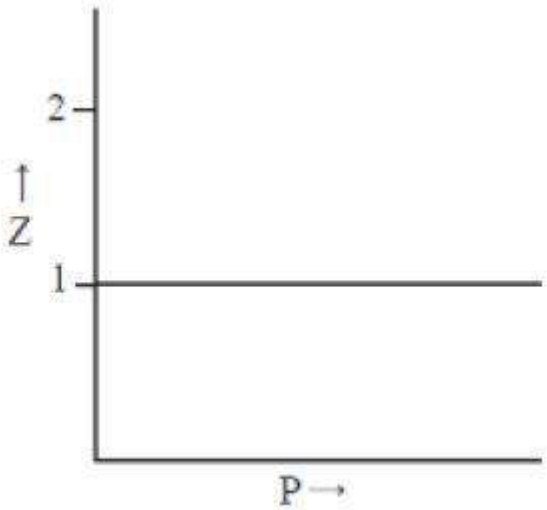
1. ✖ 

2. ✖





3. ✔



4. ✖

Question Number : 128 Question Id : 3426041248 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

At 300 K the average velocity of a gas is 3×10^2 cm/sec. The average velocity (in cm/sec) of it at 1200 K is

Options :

1. 6×10^2 ✔

2. 4×10^2 ✖

3. 8×10^2 ✖

4. 1×10^3 ✖

Question Number : 129 Question Id : 3426041249 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

56 g of CaO has been mixed with 63 g of HNO_3, the amount of $Ca(NO_3)_2$ formed is

Options :

1. 4 g ✖

8.28 g

2. ✖

164 g

3. ✖

82 g

4. ✔

Question Number : 130 Question Id : 3426041250 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

In Pb_3O_4, the different oxidation states of Pb is/are

Options :

2.66 only

1. ✖

2 only

2. ✖

2 and 4 only

3. ✔

2, 4 and 1

4. ✖

Question Number : 131 Question Id : 3426041251 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Which of the following options are correct?

Options	$\Delta_r H^\circ$	$\Delta_r S^\circ$	$\Delta_r G^\circ$	Spontaneity of the reaction
A	+	+	+	Spontaneous at low T
B	+	+	–	Spontaneous at high T
C	–	–	–	Spontaneous at low T
D	+	–	+	Spontaneous at high T

Options :

1. ✖ A, B, C only

2. ✖ B only

3. ✔ B, C only

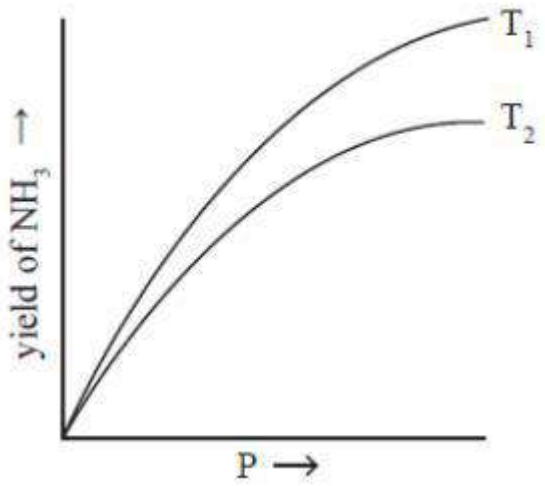
4. ✖ C, D only

Question Number : 132 Question Id : 3426041252 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

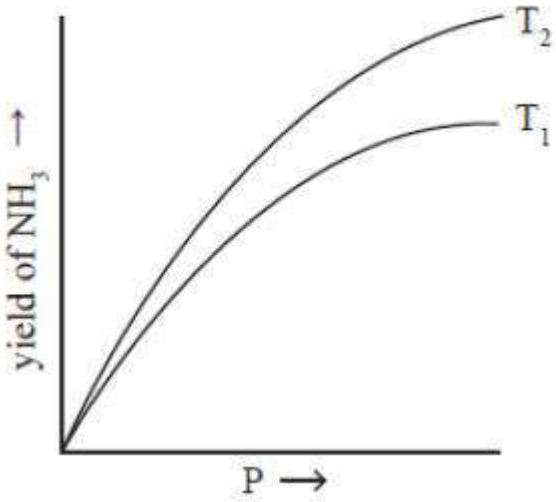
For the formation of NH_3 (g) from H_2 and N_2, which one of the following graphs represents the yield of ammonia at equilibrium?

(Assume $T_1 < T_2$, unless mentioned)

Options :

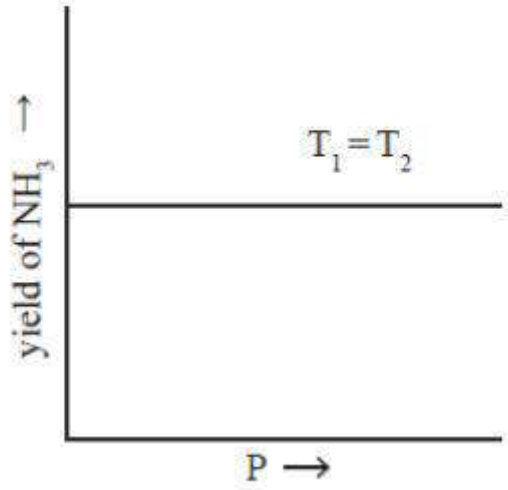


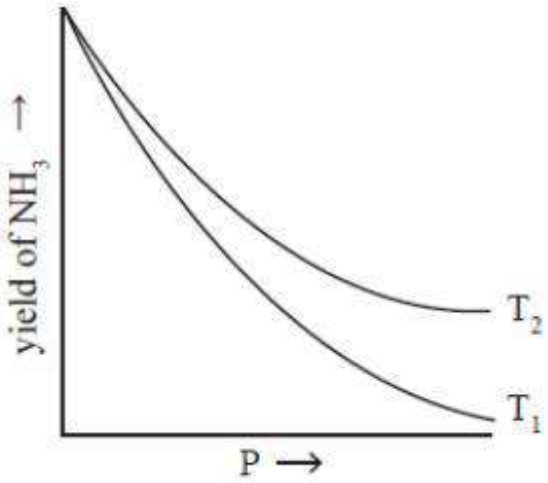
1. ✔



2. ✖

3. ✖





4. ✖

Question Number : 133 Question Id : 3426041253 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the formation of NH_3 (g) from its constituent elements, the favourable conditions for its formation are

Options :

High pressure and low temperature

1. ✔

2. ✖

High pressure and high temperature

Low pressure and high temperature

3. ✖

Low pressure and low temperature

4. ✖

Question Number : 134 Question Id : 3426041254 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The ratio of the viscosity (in centipoise) of D_2O to that of H_2O at $25\,^{\circ}C$ is

Options :

1

1. ✖

1.1

2. ✖

1.24

3. ✔

0.9

4. ✖

Question Number : 135 Question Id : 3426041255 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The correct statements are

(I) The low solubility of LiF is due to its high lattice enthalphy

(II) LiBr is not soluble in acetone

(III) LiCl is soluble in pyridine

(IV) The order of melting points of alkali metal halides is MF > MCl > MBr > MI

Options :

1. (I), (II) and (III) ✖

2. (II), (III) and (IV) ✖

3. (I), (II) and (IV) ✖

4. (I), (III) and (IV) ✔

Question Number : 136 Question Id : 3426041256 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Amphoteric hydroxide from the following is

Options :

$Al(OH)_3$

1. ✔

$In(OH)_3$

2. ✖

$B(OH)_3$

3. ✖

$Tl(OH)_3$

4. ✖

Question Number : 137 Question Id : 3426041257 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Among the following options the element with the highest density and lowest boiling point is

Options :

C

1. ✖

Sn

2. ✖

Pb

3. ✔

Ge

4. ✖

Question Number : 138 Question Id : 3426041258 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The reagent used in the determination of the chemical oxygen demand (COD) of water sample is

Options :

Potassium permanganate

1. ✖

Sulphuric acid

2. ✖

Acidified Potassium dichromate

3. ✔

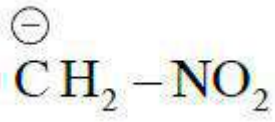
Potassium dichromate

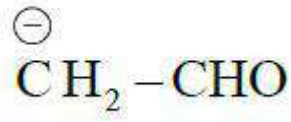
4. ✖

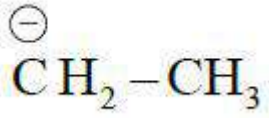
Question Number : 139 Question Id : 3426041259 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

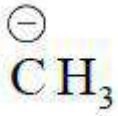
Which one of the carbanions is the least stable?

Options :

1. ✖ 

2. ✖ 

3. ✔ 

4. ✖ 

Question Number : 140 Question Id : 3426041260 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of π – bonds and lone pair(s) present in the major benzenoid product, which formed when benzene is reacted with acetyl chloride in the presence of anhydrous aluminium chloride; respectively are

Options :

1. ✖ 5; 2

2. ✔ 4; 2

5; 4

3. ✖

6; 4

4. ✖

Question Number : 141 Question Id : 3426041261 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For a molecular formula of C_6H_{10} of an alkyne series, the number of possible branched isomers is

Options :

2

1. ✖

3

2. ✖

4

3. ✔

5

4. ✖

Question Number : 142 Question Id : 3426041262 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Which of the following is correct in the crystal lattice given below?

Options :

1. ✖ Nearest neighbour distance in NaCl = $\frac{a}{\sqrt{2}}$

2. ✖ Total volume of a unit cell in CCP = $\left(r\sqrt{2}\right)^3$

3. ✖ Packing fraction of BCC is more than that of a FCC unit cell

4. ✔ Nearest neighbour distance in CsCl = $a\frac{\sqrt{3}}{2}$

Question Number : 143 Question Id : 3426041263 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Calculate the molal depression constant of a solution, which freezes at 15 °C . The latent heat of fusion is 180.7 Jg^{-1}

Options :

1. ✔ $3.81\ K\ molal^{-1}$

$0.381\ \text{K molal}^{-1}$

2. ✖

$1.90\ \text{K molal}^{-1}$

3. ✖

$0.19\ \text{K molal}^{-1}$

4. ✖

Question Number : 144 Question Id : 3426041264 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

pH of a 0.1M monobasic acid is 2. Its osmotic pressure at a given temperature T (K) is (Given that the effective concentration for osmotic pressure is $(1+\alpha) \times$ concentration of acid; α is the dissociation factor)

Options :

RT

1. ✖

$0.11\ RT$

2. ✔

$0.01\ RT$

3. ✖

$0.001\ RT$

4. ✖

Question Number : 145 Question Id : 3426041265 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For the cell reaction $Cu/Cu^{2+}(0.1M) \parallel Cu^{2+}(1.0M)/Cu$; the emf of the cell at 25 °C is

$\left[E^{\circ}_{Cu^{2+}/Cu} = 0.34V\right]$

Options :

$0.059\ V$

1. ✖

$0.311V$

2. ✖

$0.369\ V$

3. ✖

$0.029\ V$

4. ✔

Question Number : 146 Question Id : 3426041266 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

For a hypothetical reaction $A \rightarrow C$

$$A \underset{k_2}{\overset{k_1}{\rightleftharpoons}} B\,[\text{Fast}]$$

$$A + B \xrightarrow{k_3} C(\text{Slow})$$

Rate law for this reaction is

Options :

1. $\propto [A][B]$ ✔

2. $\propto [A]^2$ ✖

3. $\propto [A]^2[B]^2$ ✖

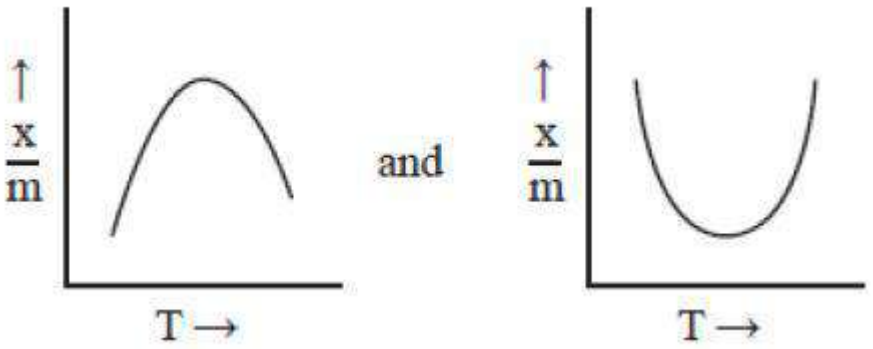
4. $\propto [A]^2[B]$ ✖

Question Number : 147 Question Id : 3426041267 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

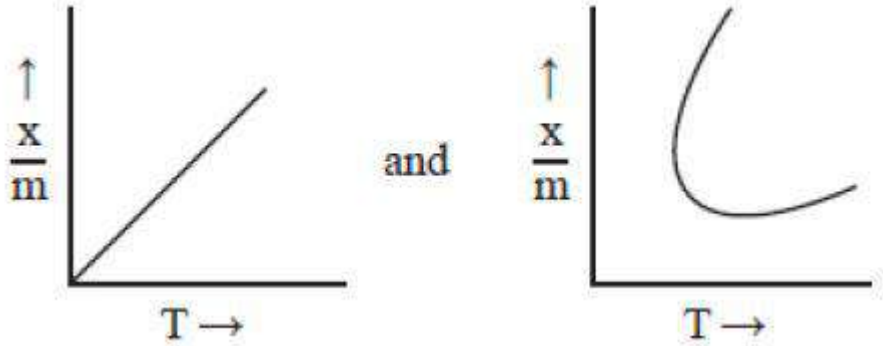
The shape of isobar for physical adsorption and adsorption isobar for chemisorption, respectively, are

Options :

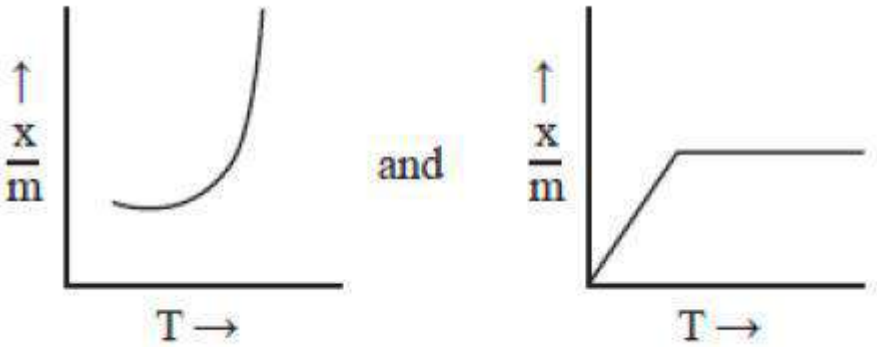
1. ✖



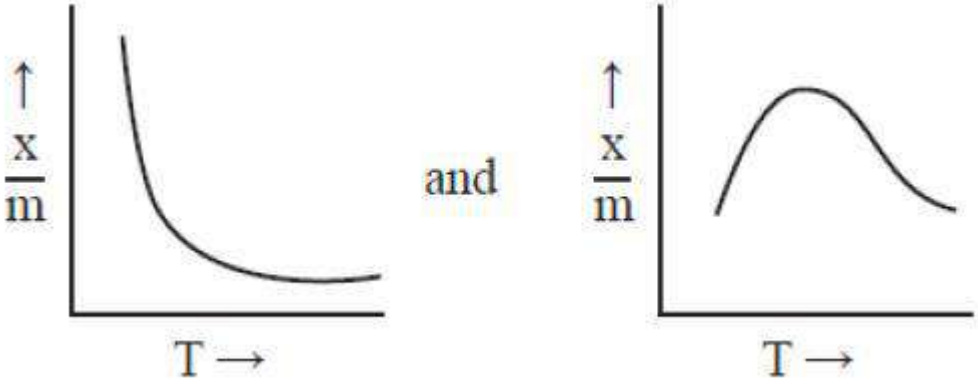
2. ✖



3. ✖



4. ✔



Question Number : 148 Question Id : 3426041268 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

False statement about white phosphorous is

Options :

1. ✖ It is highly soluble in carbon disulphide

2. ✖ The angle $\angle PPP$ in P_4 molecule is 60°

3. ✔ White P_4 molecules contains four P−P covalent bonds

4. ✖ White phosphorous is the most reactive allotrope of phosphorous

Question Number : 149 Question Id : 3426041269 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The electronegativity order of the following elements is

Options :

1. ✖ $N > S > Te > I$

I > N > S > Te

2. ✖

N > I > S > Te

3. ✔

N > S > I > Te

4. ✖

Question Number : 150 Question Id : 3426041270 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

	List-I Element		List -II Property
A)	He	I)	can be used as inert atmosphere
B)	Ar	II)	Radioactive element
C)	Xe	III)	Form fluoride compounds
D)	Rn	IV)	can be used as airship balloons

The correct match is

Options :

A	B	C	D
IV	III	II	I

1. ✖

A	B	C	D
IV	I	III	II

2. ✔

A	B	C	D
I	II	III	IV

3. ✖

A	B	C	D
II	I	IV	III

4. ✖

Question Number : 151 Question Id : 3426041271 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The number of unpaired electrons in Co^{2+}, is

Options :

2

1. ✖

3

2. ✔

3. ✖ 4

4. ✖ 5

Question Number : 152 Question Id : 3426041272 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The Wilkinson catalyst is

Options :

1. ✖ $\left[(PPh_3)_2 RhCl_2\right]$

2. ✔ $\left[(PPh_3)_3 RhCl\right]$

3. ✖ $\left[(PPh_3) RhCl_3\right]$

4. ✖ $\left[(PPh_3)_4 RhCl\right]$

Question Number : 153 Question Id : 3426041273 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Assertion (A): Adenine and guanine are present in RNA as purine bases.

Reason(R) : The base uracil is present in RNA.

The correct option among the following is

Options :

1. ✖ (A) is true, (R) is true and (R) is the correct explanation for (A)

2. ✔ (A) is true, (R) is true but (R) is not the correct explanation for (A)

3. ✖ (A) is true but (R) is false

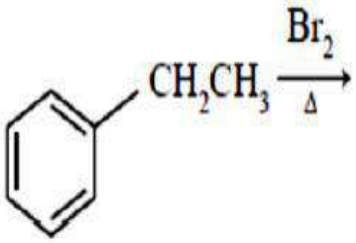
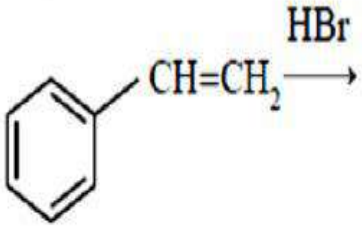
4. ✖ (A) is false but (R) is true

Question Number : 154 Question Id : 3426041274 Question Type : MCQ Option Shuffling : Yes

Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

Correct Marks : 1 Wrong Marks : 0

Match the following

List-I Reaction		List -II Major product
A)	$CH_3CH=CH_2 \xrightarrow{HI}$	I) 1-Bromo-2- phenylethane
B)		II) 1- Iodopropane
C)		III) 2- Iodopropane
		IV) 1-Bromo-1- phenylethane

The correct match is

Options :

1. ✖

A	B	C
II	I	IV

2. ✔

A	B	C
III	IV	IV

3. ✖

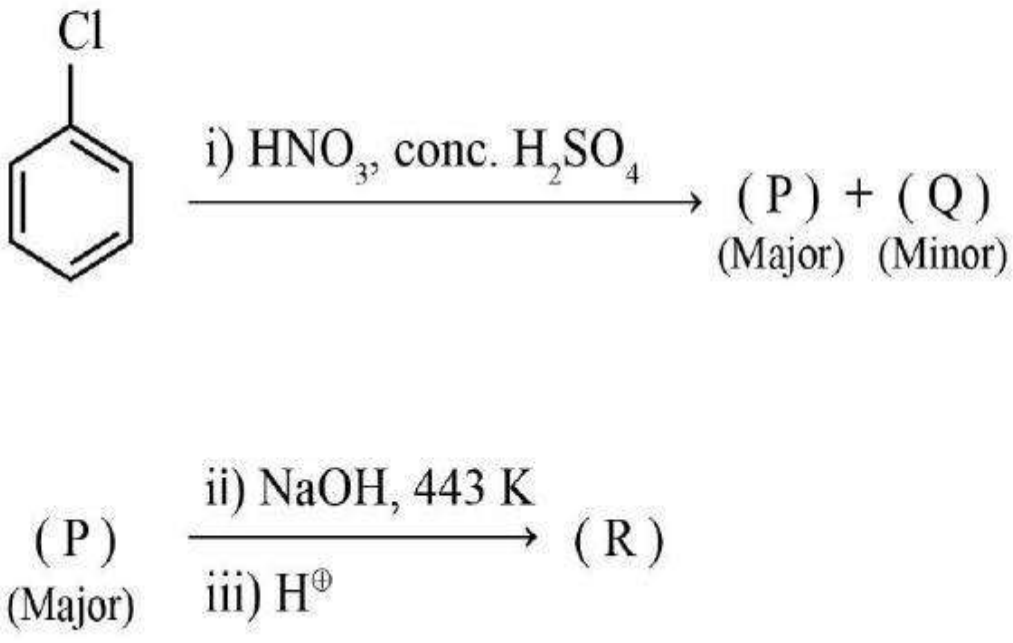
A	B	C
III	I	I

A	B	C
II	IV	I

4. ✖

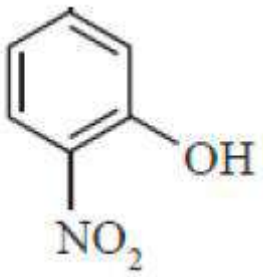
Question Number : 155 Question Id : 3426041275 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The product (R) in the following synthetic scheme is



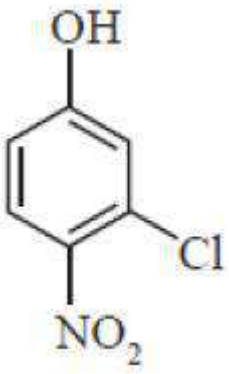
Options :

1. ✖

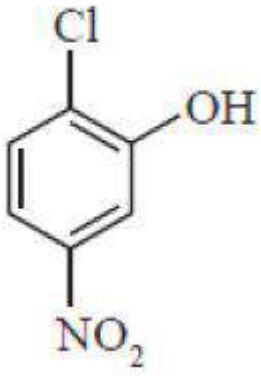




2. ✔



3. ✖

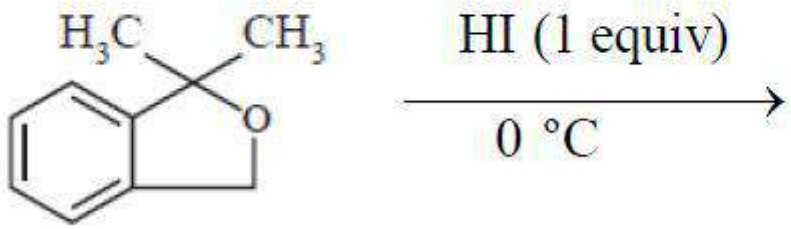


4. ✖

Question Number : 156 Question Id : 3426041276 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical

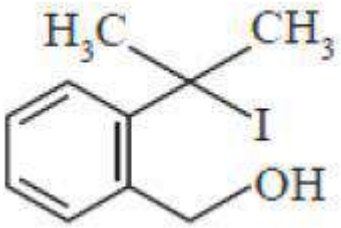
Correct Marks : 1 Wrong Marks : 0

The major product of the following reaction is

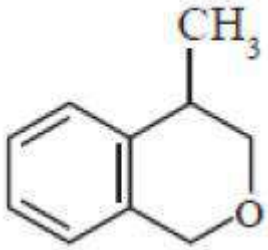


Options :

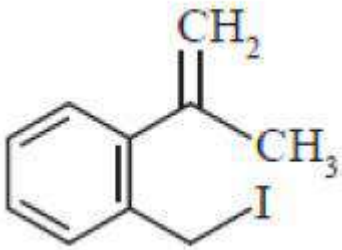
1. ✔



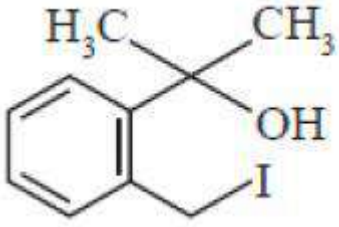
2. ✖



3. ✖

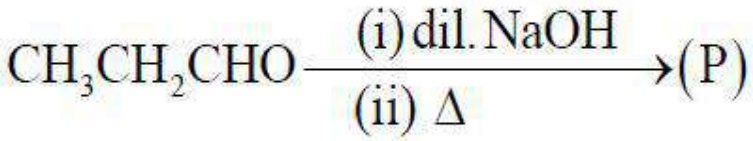


4. ✖



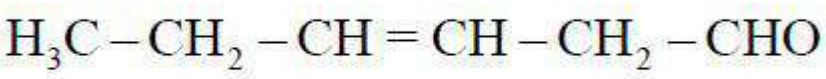
Question Number : 157 Question Id : 3426041277 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

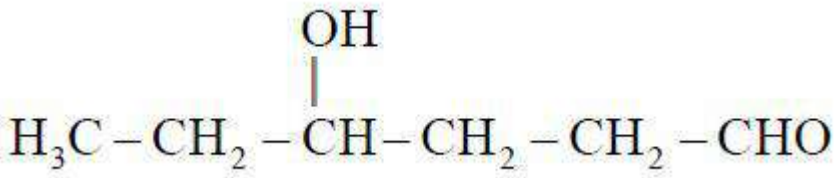
Identify the major product (P) in the given reaction

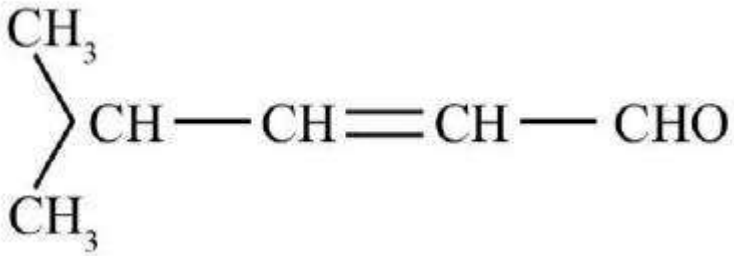


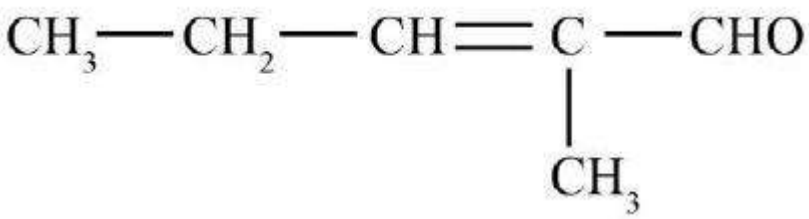
In the above reaction "P" is

Options :

1.  ✖

2.  ✖

3.  ✖

4.  ✔

Question Number : 158 Question Id : 3426041278 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

Match the following

List-I		List -II	
A)	Tollens reagent	I)	Pararosaniline + SO_2
B)	Schiff's reagent	II)	Rochelle salt + aq. NaOH
C)	Rosenmund reduction	III)	Ammonical silver nitrate
D)	Fehling solution 'B'	IV)	Pd + $BaSO_4$

The correct match is

Options :

A	B	C	D
III	I	IV	II

1. ✔

A	B	C	D
II	III	I	IV

2. ✖

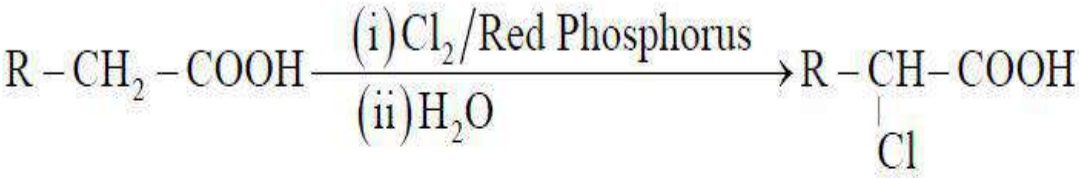
3. ✖

A	B	C	D
I	III	IV	II

A	B	C	D
II	IV	III	I

4. ✖

Question Number : 159 Question Id : 3426041279 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0



The above reaction is known as

Options :

Friedel – Crafts reaction

1. ✖

Kolbe – Schmidt reaction

2. ✖

Hell – Volhard – Zelinsky reaction

3. ✔

Cannizzaro reaction

4. ✖

Question Number : 160 Question Id : 3426041280 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The reaction between acetic acid and ammonia gives

Options :

1. CH_3CONH_2 ✔

2. $CH_3CONHCH_3$ ✖

3. CH_3CN ✖

4. CH_3COONH_4 ✖