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Subject	B. Tech

Section : **Mathematics Section A**

Q.1

Let $f:\left[-\frac{\pi}{2},\frac{\pi}{2}\right]\to\mathbf{R}$ be a differentiable function such that $f(0)=\frac{1}{2}$. If the $\lim\limits_{x\to 0}\frac{x\int_0^x f(t)dt}{e^{x^2}-1}=\alpha$, then $8\alpha^2$ is equal to :

Options

1. 2
2. 1
3. 16
4. 4

Question Type : **MCQ**
Question ID : **533543834**
Option 1 ID : **5335432740**
Option 2 ID : **5335432739**
Option 3 ID : **5335432742**
Option 4 ID : **5335432741**
Status : **Not Answered**
Chosen Option : **--**

Q.2

Let S_n denote the sum of first n terms of an arithmetic progression. If $S_{20}=790$ and $S_{10}=145$, then $S_{15}-S_5$ is :

Options

1. 410
2. 405
3. 390
4. 395

Question Type : **MCQ**
Question ID : **533543832**
Option 1 ID : **5335432734**
Option 2 ID : **5335432731**
Option 3 ID : **5335432733**
Option 4 ID : **5335432732**
Status : **Answered**
Chosen Option : **4**

Q.3 Let M denote the median of the following frequency distribution

Class	0 – 4	4 – 8	8 – 12	12 – 16	16 – 20
Frequency	3	9	10	8	6

Then 20M is equal to :

Options

1. 104
2. 416
3. 208
4. 52

Question Type : **MCQ**
Question ID : **533543845**
Option 1 ID : **5335432784**
Option 2 ID : **5335432786**
Option 3 ID : **5335432785**
Option 4 ID : **5335432783**
Status : **Answered**
Chosen Option : **3**

Q.4 If the length of the minor axis of an ellipse is equal to half of the distance between the foci, then the eccentricity of the ellipse is :

Options

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

Question Type : **MCQ**
Question ID : **533543841**
Option 1 ID : **5335432767**
Option 2 ID : **5335432768**
Option 3 ID : **5335432770**
Option 4 ID : **5335432769**
Status : **Answered**
Chosen Option : **1**

Q.5 If $2\sin^3 x + \sin 2x \cos x + 4\sin x - 4 = 0$ has exactly 3 solutions in the interval $\left[0, \frac{n\pi}{2}\right]$, $n \in N$, then the roots of the equation $x^2 + nx + (n-3) = 0$ belong to :

Options

1. $\left(-\frac{\sqrt{17}}{2}, \frac{\sqrt{17}}{2}\right)$
2. $(0, \infty)$
3. $(-\infty, 0)$
4. Z

Question Type : **MCQ**
Question ID : **533543846**
Option 1 ID : **5335432790**
Option 2 ID : **5335432788**
Option 3 ID : **5335432789**
Option 4 ID : **5335432787**
Status : **Not Answered**
Chosen Option : **--**

Q.6 Two integers x and y are chosen with replacement from the set $\{0, 1, 2, 3, ..., 10\}$. Then the probability that $|x - y| > 5$, is :

Options

1. $\frac{62}{121}$
2. $\frac{31}{121}$
3. $\frac{60}{121}$
4. $\frac{30}{121}$

Question Type : **MCQ**
Question ID : **533543831**
Option 1 ID : **5335432729**
Option 2 ID : **5335432730**
Option 3 ID : **5335432727**
Option 4 ID : **5335432728**
Status : **Not Answered**
Chosen Option : **--**

Q.7

Let (α, β, γ) be the foot of perpendicular from the point $(1, 2, 3)$ on the line $\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3}$.

Then $19(\alpha+\beta+\gamma)$ is equal to :

Options

1. 102
2. 99
3. 100
4. 101

Question Type : **MCQ**
Question ID : **533543842**
Option 1 ID : **5335432774**
Option 2 ID : **5335432771**
Option 3 ID : **5335432772**
Option 4 ID : **5335432773**
Status : **Answered**
Chosen Option : **1**

Q.8

The value of $\lim_{n\to\infty} \sum_{k=1}^{n} \frac{n^3}{(n^2+k^2)(n^2+3k^2)}$ is :

Options

1. $\frac{(2\sqrt{3}+3)\pi}{24}$
2. $\frac{13\pi}{8(4\sqrt{3}+3)}$
3. $\frac{13(2\sqrt{3}-3)\pi}{8}$
4. $\frac{\pi}{8(2\sqrt{3}+3)}$

Question Type : **MCQ**
Question ID : **533543836**
Option 1 ID : **5335432748**
Option 2 ID : **5335432750**
Option 3 ID : **5335432747**
Option 4 ID : **5335432749**
Status : **Not Answered**
Chosen Option : **--**

Q.9 A line passing through the point A(9, 0) makes an angle of 30° with the positive direction of x-axis. If this line is rotated about A through an angle of 15° in the clockwise direction, then its equation in the new position is :

Options

1. $\frac{y}{\sqrt{3}+2}+x=9$
2. $\frac{x}{\sqrt{3}+2}+y=9$
3. $\frac{y}{\sqrt{3}-2}+x=9$
4. $\frac{x}{\sqrt{3}-2}+y=9$

Question Type : **MCQ**
Question ID : **533543839**
Option 1 ID : **5335432761**
Option 2 ID : **5335432762**
Option 3 ID : **5335432759**
Option 4 ID : **5335432760**
Status : **Not Answered**
Chosen Option : **--**

Q.10 The area (in square units) of the region bounded by the parabola $y^2=4(x-2)$ and the line $y=2x-8$, is :

Options

1. 8
2. 9
3. 6
4. 7

Question Type : **MCQ**
Question ID : **533543837**
Option 1 ID : **5335432753**
Option 2 ID : **5335432754**
Option 3 ID : **5335432751**
Option 4 ID : **5335432752**
Status : **Not Answered**
Chosen Option : **--**

Q.11 Let $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$ and $\vec{b} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$ be two vectors such that $|\vec{a}| = 1$, $\vec{a} \cdot \vec{b} = 2$ and $|\vec{b}| = 4$. If $\vec{c} = 2(\vec{a} \times \vec{b}) - 3\vec{b}$, then the angle between $\vec{b}$ and $\vec{c}$ is equal to :

Options

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

2. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

3. $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

4. $\cos^{-1}\left(\frac{2}{3}\right)$

Question Type : **MCQ**
Question ID : **533543844**
Option 1 ID : **5335432782**
Option 2 ID : **5335432779**
Option 3 ID : **5335432780**
Option 4 ID : **5335432781**
Status : **Not Answered**
Chosen Option : **--**

Q.12 Consider the system of linear equations $x+y+z=4\mu$, $x+2y+2\lambda z=10\mu$, $x+3y+4\lambda^2 z=\mu^2+15$, where $\lambda, \mu \in \mathbf{R}$. Which one of the following statements is **NOT** correct ?

Options

1. The system is consistent if $\lambda \neq \frac{1}{2}$

2. The system is inconsistent if $\lambda = \frac{1}{2}$ and $\mu \neq 1$

3. The system has infinite number of solutions if $\lambda = \frac{1}{2}$ and $\mu = 15$

4. The system has unique solution if $\lambda \neq \frac{1}{2}$ and $\mu \neq 1, 15$

Question Type : **MCQ**
Question ID : **533543829**
Option 1 ID : **5335432719**
Option 2 ID : **5335432720**
Option 3 ID : **5335432722**
Option 4 ID : **5335432721**
Status : **Answered**
Chosen Option : **4**

Q.13 If the circles $(x+1)^2+(y+2)^2=r^2$ and $x^2+y^2-4x-4y+4=0$ intersect at exactly two distinct points, then

Options

1. $5 < r < 9$
2. $3 < r < 7$
3. $\frac{1}{2} < r < 7$
4. $0 < r < 7$

Question Type : **MCQ**
Question ID : **533543840**
Option 1 ID : **5335432766**
Option 2 ID : **5335432765**
Option 3 ID : **5335432763**
Option 4 ID : **5335432764**
Status : **Not Answered**
Chosen Option : **--**

Q.14 Let $y=y(x)$ be the solution of the differential equation $\sec x\, dy+\{2(1-x)\tan x+x(2-x)\}\, dx=0$ such that $y(0)=2$. Then $y(2)$ is equal to :

Options

1. $2\{\sin(2)+1\}$
2. 2
3. 1
4. $2\{1-\sin(2)\}$

Question Type : **MCQ**
Question ID : **533543838**
Option 1 ID : **5335432757**
Option 2 ID : **5335432756**
Option 3 ID : **5335432755**
Option 4 ID : **5335432758**
Status : **Not Answered**
Chosen Option : **--**

Q.15 If $z = x + iy$, $xy \neq 0$, satisfies the equation $z^2 + i\bar{z} = 0$, then $|z^2|$ is equal to :

Options

1. 1
2. 9
3. $\frac{1}{4}$
4. 4

Question Type : **MCQ**
Question ID : **533543828**
Option 1 ID : **5335432716**
Option 2 ID : **5335432718**
Option 3 ID : **5335432715**
Option 4 ID : **5335432717**
Status : **Answered**
Chosen Option : **4**

Q.16

$$\text{If } f(x) = \begin{vmatrix} 2\cos^4 x & 2\sin^4 x & 3+\sin^2 2x \\ 3+2\cos^4 x & 2\sin^4 x & \sin^2 2x \\ 2\cos^4 x & 3+2\sin^4 x & \sin^2 2x \end{vmatrix},$$

then $\frac{1}{5} f'(0) =$ is equal to :

Options

1. 2
2. 6
3. 1
4. 0

Question Type : **MCQ**
Question ID : **533543830**
Option 1 ID : **5335432725**
Option 2 ID : **5335432726**
Option 3 ID : **5335432724**
Option 4 ID : **5335432723**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.17 The maximum area of a triangle whose one vertex is at (0, 0) and the other two vertices lie on the curve $y = -2x^2 + 54$ at points (x, y) and $(-x, y)$, where $y > 0$, is :

Options

1. 88
2. 108
3. 122
4. 92

Question Type : **MCQ**
Question ID : **533543833**
Option 1 ID : **5335432737**
Option 2 ID : **5335432736**
Option 3 ID : **5335432738**
Option 4 ID : **5335432735**
Status : **Not Answered**
Chosen Option : **--**

Q.18 Let $g : \mathbf{R} \to \mathbf{R}$ be a non constant twice differentiable function such that $g'\left(\frac{1}{2}\right) = g'\left(\frac{3}{2}\right)$. If a real valued function f is defined as $f(x) = \frac{1}{2}[g(x) + g(2-x)]$, then

Options

1. $f'\left(\frac{3}{2}\right) + f'\left(\frac{1}{2}\right) = 1$
2. $f''(x) = 0$ for no x in $(0, 1)$
3. $f''(x) = 0$ for atleast two x in $(0, 2)$
4. $f''(x) = 0$ for exactly one x in $(0, 1)$

Question Type : **MCQ**
Question ID : **533543835**
Option 1 ID : **5335432746**
Option 2 ID : **5335432745**
Option 3 ID : **5335432743**
Option 4 ID : **5335432744**
Status : **Answered**
Chosen Option : **2**

Q.19 Let A(2, 3, 5) and C(−3, 4, −2) be opposite vertices of a parallelogram ABCD. If the diagonal $\overrightarrow{BD} = \hat{i} + 2\hat{j} + 3\hat{k}$, then the area of the parallelogram is equal to :

Options

1. $\frac{1}{2}\sqrt{410}$
2. $\frac{1}{2}\sqrt{474}$
3. $\frac{1}{2}\sqrt{306}$
4. $\frac{1}{2}\sqrt{586}$

Question Type : **MCQ**
Question ID : **533543843**
Option 1 ID : **5335432777**
Option 2 ID : **5335432775**
Option 3 ID : **5335432776**
Option 4 ID : **5335432778**
Status : **Answered**
Chosen Option : **1**

Q.20 If the domain of the function $f(x) = \cos^{-1}\left(\frac{2-|x|}{4}\right) + \{\log_e(3-x)\}^{-1}$ is $[-\alpha, \beta) - \{\gamma\}$, then $\alpha + \beta + \gamma$ is equal to :

Options

1. 12
2. 8
3. 9
4. 11

Question Type : **MCQ**
Question ID : **533543827**
Option 1 ID : **5335432714**
Option 2 ID : **5335432711**
Option 3 ID : **5335432712**
Option 4 ID : **5335432713**
Status : **Answered**
Chosen Option : **3**

Section : **Mathematics Section B**

Q.21

If the function

$$f(x)=\begin{cases}\dfrac{1}{|x|} & , \quad |x|\geq 2\\ ax^2+2b, & |x|<2\end{cases}$$

is differentiable on **R**, then $48(a+b)$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543856**
Status : **Not Answered**

Q.22

Let $\alpha, \beta \in \mathbf{N}$ be roots of the equation $x^2-70x+\lambda=0$, where $\frac{\lambda}{2}, \frac{\lambda}{3} \notin \mathbf{N}$. If λ assumes the minimum possible value, then $\dfrac{\left(\sqrt{\alpha-1}+\sqrt{\beta-1}\right)(\lambda+35)}{|\alpha-\beta|}$ is equal to :

Given --
Answer :

Question Type : **SA**
Question ID : **533543848**
Status : **Not Answered**

Q.23

The value of $9\int_0^9\left[\sqrt{\dfrac{10x}{x+1}}\right]dx$, where [t] denotes the greatest integer less than or equal to t, is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543851**
Status : **Not Answered**

Q.24

Let $\alpha=1^2+4^2+8^2+13^2+19^2+26^2+\ldots$ upto 10 terms and $\beta=\sum_{n=1}^{10} n^4$. If $4\alpha-\beta=55k+40$, then k is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543850**
Status : **Not Answered**

Q.25

Let the latus rectum of the hyperbola $\frac{x^2}{9}-\frac{y^2}{b^2}=1$ subtend an angle of $\frac{\pi}{3}$ at the centre of the hyperbola. If b^2 is equal to $\frac{l}{m}(1+\sqrt{n})$, where l and m are co-prime numbers, then $l^2+m^2+n^2$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543853**
Status : **Not Answered**

Q.26 A group of 40 students appeared in an examination of 3 subjects - Mathematics, Physics and Chemistry. It was found that all students passed in atleast one of the subjects, 20 students passed in Mathematics, 25 students passed in Physics, 16 students passed in Chemistry, atmost 11 students passed in both Mathematics and Physics, atmost 15 students passed in both Physics and Chemistry, atmost 15 students passed in both Mathematics and Chemistry. The maximum number of students passed in all the three subjects is _____.

Given Answer : --

Question Type : **SA**
Question ID : **533543855**
Status : **Not Answered**

Q.27 Number of integral terms in the expansion of $\left\{7^{\left(\frac{1}{2}\right)} + 11^{\left(\frac{1}{6}\right)}\right\}^{824}$ is equal to _____.

Given Answer : **138**

Question Type : **SA**
Question ID : **533543849**
Status : **Answered**

Q.28 Let $A = \{1, 2, 3, ..., 7\}$ and let P(A) denote the power set of A. If the number of functions $f : A \to P(A)$ such that $a \in f(a)$, $\forall\ a \in A$ is m^n, m and $n \in \mathbf{N}$ and m is least, then $m + n$ is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **533543847**
Status : **Not Answered**

Q.29 Let $y = y(x)$ be the solution of the differential equation $(1 - x^2)\,dy = \left[xy + (x^3 + 2)\sqrt{3(1 - x^2)}\right]dx$, $-1 < x < 1$, $y(0) = 0$. If $y\left(\frac{1}{2}\right) = \frac{m}{n}$, m and n are co-prime numbers, then $m + n$ is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **533543852**
Status : **Not Answered**

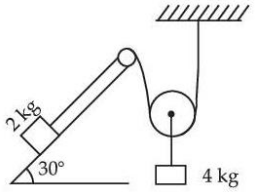
Q.30 If d_1 is the shortest distance between the lines $x + 1 = 2y = -12z$, $x = y + 2 = 6z - 6$ and d_2 is the shortest distance between the lines $\frac{x-1}{2} = \frac{y+8}{-7} = \frac{z-4}{5}$, $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-6}{-3}$, then the value of $\frac{32\sqrt{3}\,d_1}{d_2}$ is :

Given Answer : **24**

Question Type : **SA**
Question ID : **533543854**
Status : **Answered**

Section : **Physics Section A**

Q.31 All surfaces shown in figure are assumed to be frictionless and the pulleys and the string are light. The acceleration of the block of mass 2 kg is :

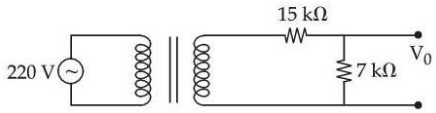


Options

1. $\frac{g}{4}$
2. g
3. $\frac{g}{3}$
4. $\frac{g}{2}$

Question Type : **MCQ**
Question ID : **533543860**
Option 1 ID : **5335432814**
Option 2 ID : **5335432816**
Option 3 ID : **5335432813**
Option 4 ID : **5335432815**
Status : **Answered**
Chosen Option : **1**

Q.32 Primary coil of a transformer is connected to 220 V ac. Primary and secondary turns of the transforms are 100 and 10 respectively. Secondary coil of transformer is connected to two series resistances shown in figure. The output voltage (V_0) is :



Options

1. 15 V
2. 7 V
3. 22 V
4. 44 V

Question Type : **MCQ**
Question ID : **533543876**
Option 1 ID : **5335432879**
Option 2 ID : **5335432878**
Option 3 ID : **5335432877**
Option 4 ID : **5335432880**
Status : **Answered**
Chosen Option : **3**

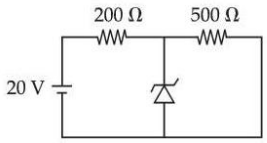
Q.33 The diffraction pattern of a light of wavelength 400 nm diffracting from a slit of width 0.2 mm is focused on the focal plane of a convex lens of focal length 100 cm. The width of the 1st secondary maxima will be :

Options

1. 0.2 mm
2. 0.02 mm
3. 2 cm
4. 2 mm

Question Type : **MCQ**
Question ID : **533543871**
Option 1 ID : **5335432858**
Option 2 ID : **5335432859**
Option 3 ID : **5335432860**
Option 4 ID : **5335432857**
Status : **Not Answered**
Chosen Option : **--**

Q.34 A Zener diode of breakdown voltage 10 V is used as a voltage regulator as shown in the figure. The current through the Zener diode is :

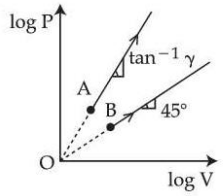


Options

1. 30 mA
2. 50 mA
3. 20 mA
4. 0

Question Type : **MCQ**
Question ID : **533543874**
Option 1 ID : **5335432871**
Option 2 ID : **5335432872**
Option 3 ID : **5335432870**
Option 4 ID : **5335432869**
Status : **Answered**
Chosen Option : **1**

Q.35 Two thermodynamical processes are shown in the figure. The molar heat capacity for process A and B are C_A and C_B. The molar heat capacity at constant pressure and constant volume are represented by C_P and C_V, respectively. Choose the correct statement.



Options

1. $C_P > C_V > C_A = C_B$
2. $C_A = 0$ and $C_B = \infty$
3. $C_A > C_P > C_V$
4. $C_B = \infty, C_A = 0$

Question Type : **MCQ**
Question ID : **533543864**
Option 1 ID : **5335432830**
Option 2 ID : **5335432831**
Option 3 ID : **5335432829**
Option 4 ID : **5335432832**
Status : **Answered**
Chosen Option : **1**

Q.36 The electric field of an electromagnetic wave in free space is represented as $\vec{E} = E_0 \cos(\omega t - kz)\,\hat{i}$.
The corresponding magnetic induction vector will be :

Options

1. $\vec{B} = E_0 C \cos(\omega t - kz)\,\hat{j}$
2. $\vec{B} = \frac{E_0}{C} \cos(\omega t - kz)\,\hat{j}$
3. $\vec{B} = E_0 C \cos(\omega t + kz)\,\hat{j}$
4. $\vec{B} = \frac{E_0}{C} \cos(\omega t + kz)\,\hat{j}$

Question Type : **MCQ**
Question ID : **533543870**
Option 1 ID : **5335432854**
Option 2 ID : **5335432853**
Option 3 ID : **5335432856**
Option 4 ID : **5335432855**
Status : **Answered**
Chosen Option : **2**

Q.37

Match **List - I** with **List - II**.

	List - I		List - II
(A)	Coefficient of viscosity	(I)	$[M L^2 T^{-2}]$
(B)	Surface tension	(II)	$[M L^2 T^{-1}]$
(C)	Angular momentum	(III)	$[M L^{-1} T^{-1}]$
(D)	Rotational kinetic energy	(IV)	$[M L^0 T^{-2}]$

Choose the **correct** answer from the options given below :

Options

1. (A)-(III), (B)-(IV), (C)-(II), (D)-(I)
2. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
3. (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
4. (A)-(IV), (B)-(III), (C)-(II), (D)-(I)

Question Type : **MCQ**
Question ID : **533543857**
Option 1 ID : **5335432802**
Option 2 ID : **5335432801**
Option 3 ID : **5335432803**
Option 4 ID : **5335432804**
Status : **Answered**
Chosen Option : **4**

Q.38

A series L.R circuit connected with an ac source E = (25 sin 1000 t) V has a power factor of $\frac{1}{\sqrt{2}}$. If the source of emf is changed to E = (20 sin 2000 t) V, the new power factor of the circuit will be :

Options

1. $\frac{1}{\sqrt{7}}$
2. $\frac{1}{\sqrt{5}}$
3. $\frac{1}{\sqrt{3}}$
4. $\frac{1}{\sqrt{2}}$

Question Type : **MCQ**
Question ID : **533543869**
Option 1 ID : **5335432852**
Option 2 ID : **5335432851**
Option 3 ID : **5335432850**
Option 4 ID : **5335432849**
Status : **Answered**
Chosen Option : **4**

Q.39 The ratio of the magnitude of the kinetic energy to the potential energy of an electron in the 5th excited state of a hydrogen atom is :

Options

1. $\frac{1}{4}$
2. $\frac{1}{2}$
3. 1
4. 4

Question Type : **MCQ**
Question ID : **533543873**
Option 1 ID : **5335432867**
Option 2 ID : **5335432866**
Option 3 ID : **5335432865**
Option 4 ID : **5335432868**
Status : **Answered**
Chosen Option : **2**

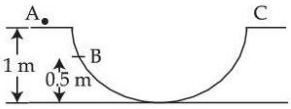
Q.40 A spherical body of mass 100 g is dropped from a height of 10 m from the ground. After hitting the ground, the body rebounds to a height of 5 m. The impulse of force imparted by the ground to the body is given by : (given, $g = 9.8\ m/s^2$)

Options

1. $2.39\ kg\ ms^{-1}$
2. $43.2\ kg\ ms^{-1}$
3. $23.9\ kg\ ms^{-1}$
4. $4.32\ kg\ ms^{-1}$

Question Type : **MCQ**
Question ID : **533543859**
Option 1 ID : **5335432809**
Option 2 ID : **5335432810**
Option 3 ID : **5335432811**
Option 4 ID : **5335432812**
Status : **Not Answered**
Chosen Option : **--**

Q.41 A particle is placed at the point A of a frictionless track ABC as shown in figure. It is gently pushed towards right. The speed of the particle when it reaches the point B is : (Take $g = 10\ m/s^2$).



Options

1. $2\sqrt{10}$ m/s
2. $\sqrt{10}$ m/s
3. 10 m/s
4. 20 m/s

Question Type : **MCQ**
Question ID : **533543861**
Option 1 ID : **5335432819**
Option 2 ID : **5335432818**
Option 3 ID : **5335432817**
Option 4 ID : **5335432820**
Status : **Not Answered**
Chosen Option : **--**

Q.42 The work function of a substance is 3.0 eV. The longest wavelength of light that can cause the emission of photoelectrons from this substance is approximately;

Options

1. 200 nm
2. 215 nm
3. 400 nm
4. 414 nm

Question Type : **MCQ**
Question ID : **533543872**
Option 1 ID : **5335432863**
Option 2 ID : **5335432864**
Option 3 ID : **5335432861**
Option 4 ID : **5335432862**
Status : **Not Answered**
Chosen Option : **--**

Q.43 A particle of mass m is projected with a velocity 'u' making an angle of 30° with the horizontal. The magnitude of angular momentum of the projectile about the point of projection when the particle is at its maximum height h is :

Options

1. $\frac{\sqrt{3}}{16}\frac{mu^3}{g}$
2. zero
3. $\frac{mu^3}{\sqrt{2}\,g}$
4. $\frac{\sqrt{3}}{2}\frac{mu^2}{g}$

Question Type : **MCQ**
Question ID : **533543858**
Option 1 ID : **5335432807**
Option 2 ID : **5335432806**
Option 3 ID : **5335432808**
Option 4 ID : **5335432805**
Status : **Answered**
Chosen Option : **4**

Q.44 Young's modules of material of a wire of length 'L' and cross-sectional area A is Y. If the length of the wire is doubled and cross-sectional area is halved then Young's modules will be :

Options

1. 4 Y
2. $\frac{Y}{4}$
3. Y
4. 2Y

Question Type : **MCQ**
Question ID : **533543863**
Option 1 ID : **5335432825**
Option 2 ID : **5335432826**
Option 3 ID : **5335432827**
Option 4 ID : **5335432828**
Status : **Answered**
Chosen Option : **3**

Q.45 The gravitational potential at a point above the surface of earth is -5.12×10^7 J/kg and the acceleration due to gravity at that point is 6.4 m/s^2. Assume that the mean radius of earth to be 6400 km. The height of this point above the earth's surface is :

Options

1. 1600 km
2. 1000 km
3. 1200 km
4. 540 km

Question Type : **MCQ**
Question ID : **533543862**
Option 1 ID : **5335432821**
Option 2 ID : **5335432822**
Option 3 ID : **5335432824**
Option 4 ID : **5335432823**
Status : **Not Answered**
Chosen Option : **--**

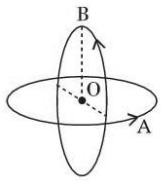
Q.46 An electric toaster has resistance of 60 Ω at room temperature (27 °C). The toaster is connected to a 220 V supply. If the current flowing through it reaches 2.75 A, the temperature attained by toaster is around : (if $\alpha = 2 \times 10^{-4}$/°C)

Options

1. 1667 °C
2. 1694 °C
3. 1235 °C
4. 694 °C

Question Type : **MCQ**
Question ID : **533543867**
Option 1 ID : **5335432842**
Option 2 ID : **5335432843**
Option 3 ID : **5335432844**
Option 4 ID : **5335432841**
Status : **Not Answered**
Chosen Option : **--**

Q.47 Two insulated circular loop A and B of radius 'a' carrying a current of 'I' in the anti clockwise direction as shown in the figure. The magnitude of the magnetic induction at the centre will be :



Options

1. $\frac{\mu_0 I}{\sqrt{2}\, a}$

2. $\frac{\mu_0 I}{2\, a}$

3. $\frac{2\, \mu_0 I}{a}$

4. $\frac{\sqrt{2}\, \mu_0 I}{a}$

Question Type : **MCQ**
Question ID : **533543868**
Option 1 ID : **5335432845**
Option 2 ID : **5335432848**
Option 3 ID : **5335432847**
Option 4 ID : **5335432846**
Status : **Answered**
Chosen Option : **1**

Q.48 At which temperature the r.m.s. velocity of a hydrogen molecule equal to that of an oxygen molecule at 47 °C ?

Options

1. 80 K

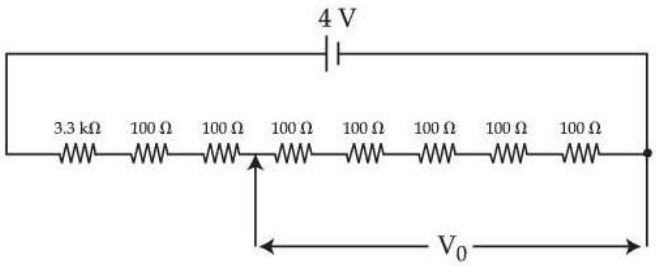
2. −73 K

3. 20 K

4. 4 K

Question Type : **MCQ**
Question ID : **533543865**
Option 1 ID : **5335432834**
Option 2 ID : **5335432835**
Option 3 ID : **5335432833**
Option 4 ID : **5335432836**
Status : **Answered**
Chosen Option : **3**

Q.49 A potential divider circuit is shown in figure. The output voltage V_0 is :



Options

1. 2 mV
2. 12 mV
3. 0.5 V
4. 4 V

Question Type : **MCQ**
Question ID : **533543875**
Option 1 ID : **5335432874**
Option 2 ID : **5335432873**
Option 3 ID : **5335432875**
Option 4 ID : **5335432876**
Status : **Not Answered**
Chosen Option : **--**

Q.50 The electrostatic potential due to an electric dipole at a distance 'r' varies as :

Options

1. $\frac{1}{r}$
2. $\frac{1}{r^3}$
3. r
4. $\frac{1}{r^2}$

Question Type : **MCQ**
Question ID : **533543866**
Option 1 ID : **5335432837**
Option 2 ID : **5335432839**
Option 3 ID : **5335432840**
Option 4 ID : **5335432838**
Status : **Answered**
Chosen Option : **2**

Section : **Physics Section B**

Q.51 A ceiling fan having 3 blades of length 80 cm each is rotating with an angular velocity of 1200 rpm. The magnetic field of earth in that region is 0.5 G and angle of dip is 30°. The emf induced across the blades is N $\pi \times 10^{-5}$ V. The value of N is _____.

Given Answer : --

Question Type : **SA**
Question ID : **533543884**
Status : **Not Answered**

Q.52 A capacitor of capacitance C and potential V has energy E. It is connected to another capacitor of capacitance 2 C and potential 2 V. Then the loss of energy is $\frac{x}{3}$ E, where x is _____.

Given Answer : **2**

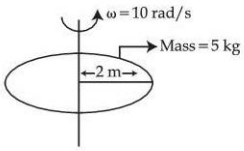
Question Type : **SA**
Question ID : **533543881**
Status : **Answered**

Q.53 The horizontal component of earth's magnetic field at a place is 3.5×10^{-5} T. A very long straight conductor carrying current of $\sqrt{2}$ A in the direction from South east to North West is placed. The force per unit length experienced by the conductor is _____ $\times 10^{-6}$ N/m.

Given Answer : --

Question Type : **SA**
Question ID : **533543883**
Status : **Not Answered**

Q.54



Consider a Disc of mass 5 kg, radius 2 m, rotating with angular velocity of 10 rad/s about an axis perpendicular to the plane of rotation. An identical disc is kept gently over the rotating disc along the same axis. The energy dissipated so that both the discs continue to rotate together without slipping is _____ J.

Given Answer : --

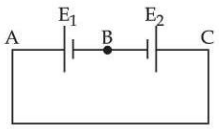
Question Type : **SA**
Question ID : **533543878**
Status : **Not Answered**

Q.55 In a closed organ pipe, the frequency of fundamental note is 30 Hz. A certain amount of water is now poured in the organ pipe so that the fundamental frequency is increased to 110 Hz. If the organ pipe has a cross-sectional area of 2 cm^2, the amount of water poured in the organ tube is _____ g. (Take speed of sound in air is 330 m/s)

Given Answer : --

Question Type : **SA**
Question ID : **533543880**
Status : **Not Answered**

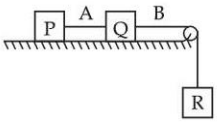
Q.56 Two cells are connected in opposition as shown. Cell E_1 is of 8 V emf and 2 Ω internal resistance; the cell E_2 is of 2 V emf and 4 Ω internal resistance. The terminal potential difference of cell E_2 is _____ V.



Given --
Answer :

Question Type : **SA**
Question ID : **533543882**
Status : **Not Answered**

Q.57 Each of three blocks P, Q and R shown in figure has a mass of 3 kg. Each of the wires A and B has cross-sectional area 0.005 cm^2 and Young's modulus 2×10^{11} N m^{-2}. Neglecting friction, the longitudinal strain on wire B is _____ $\times 10^{-4}$. (Take $g = 10$ m/s^2)



Given --
Answer :

Question Type : **SA**
Question ID : **533543879**
Status : **Not Answered**

Q.58 The distance between object and its two times magnified real image as produced by a convex lens is 45 cm. The focal length of the lens used is _____ cm.

Given --
Answer :

Question Type : **SA**
Question ID : **533543885**
Status : **Not Answered**

Q.59 The displacement and the increase in the velocity of a moving particle in the time interval of t to $(t+1)$ s are 125 m and 50 m/s, respectively. The distance travelled by the particle in $(t+2)^{th}$ s is _____ m.

Given --
Answer :

Question Type : **SA**
Question ID : **533543877**
Status : **Not Answered**

Q.60 A electron of hydrogen atom on an excited state is having energy $E_n = -0.85$ eV. The maximum number of allowed transitions to lower energy level is _____.

Given **4**
Answer :

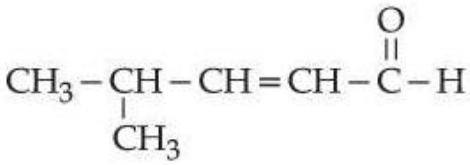
Question Type : **SA**
Question ID : **533543886**
Status : **Answered**

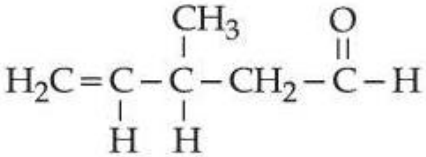
Section : **Chemistry Section A**

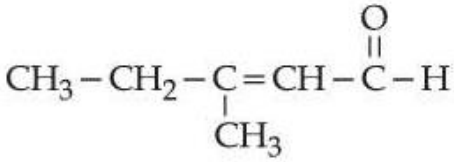
Q.61

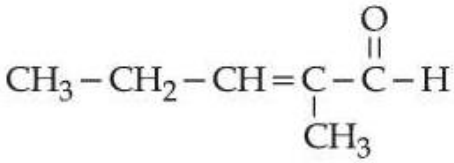
Structure of 4-Methylpent-2-enal is :

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **533543896**
Option 1 ID : **5335432928**
Option 2 ID : **5335432930**
Option 3 ID : **5335432927**
Option 4 ID : **5335432929**
Status : **Answered**
Chosen Option : **1**

Q.62

Match **List - I** with **List - II**.

	List - I		**List - II**
	Species		**Electronic distribution**
(A)	Cr^{+2}	(I)	$3d^8$
(B)	Mn^{+}	(II)	$3d^3 4s^1$
(C)	Ni^{+2}	(III)	$3d^4$
(D)	V^{+}	(IV)	$3d^5 4s^1$

Choose the **correct** answer from the options given below :

Options

1. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
2. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
3. (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
4. (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

Question Type : **MCQ**
Question ID : **533543892**
Option 1 ID : **5335432911**
Option 2 ID : **5335432912**
Option 3 ID : **5335432914**
Option 4 ID : **5335432913**
Status : **Answered**
Chosen Option : **1**

Q.63

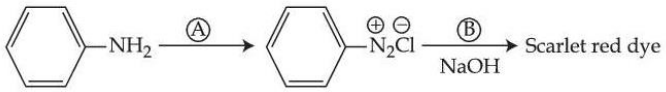
Diamagnetic Lanthanoid ions are :

Options

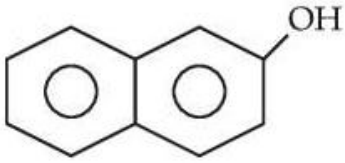
1. Nd^{3+} & Eu^{3+}
2. Lu^{3+} & Eu^{3+}
3. La^{3+} & Ce^{4+}
4. Nd^{3+} & Ce^{4+}

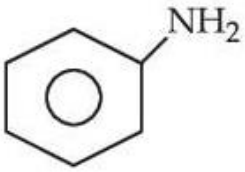
Question Type : **MCQ**
Question ID : **533543893**
Option 1 ID : **5335432918**
Option 2 ID : **5335432917**
Option 3 ID : **5335432916**
Option 4 ID : **5335432915**
Status : **Answered**
Chosen Option : **1**

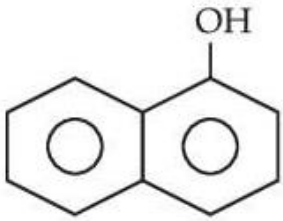
Q.64 Following is a confirmatory test for aromatic primary amines. Identify reagent (A) and (B).

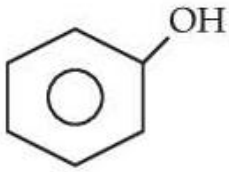


Options 1.

$A = NaNO_2 + HCl,\ 0-5°C\ ;\ B =$ 

2. $A = NaNO_2 + HCl,\ 0-5°C\ ;\ B =$ 

3. $A = NaNO_2 + HCl,\ 0-5°C\ ;\ B =$ 

4. $A = HNO_3/H_2SO_4$ $B =$ 

Question Type : **MCQ**
Question ID : **533543906**
Option 1 ID : **5335432967**
Option 2 ID : **5335432970**
Option 3 ID : **5335432968**
Option 4 ID : **5335432969**
Status : **Answered**
Chosen Option : **1**

Q.65 The Lassiagne's extract is boiled with dil HNO_3 before testing for halogens because,

Options

1. Na_2S and NaCN are decomposed by HNO_3.
2. Silver halides are soluble in HNO_3.
3. AgCN is soluble in HNO_3.
4. Ag_2S is soluble in HNO_3.

Question Type : **MCQ**
Question ID : **533543895**
Option 1 ID : **5335432924**
Option 2 ID : **5335432923**
Option 3 ID : **5335432926**
Option 4 ID : **5335432925**
Status : **Not Answered**
Chosen Option : **--**

Q.66 What happens to freezing point of benzene when small quantity of napthalene is added to benzene ?

Options

1. Decreases
2. First decreases and then increases
3. Increases
4. Remains unchanged

Question Type : **MCQ**
Question ID : **533543889**
Option 1 ID : **5335432900**
Option 2 ID : **5335432902**
Option 3 ID : **5335432899**
Option 4 ID : **5335432901**
Status : **Not Answered**
Chosen Option : **--**

Q.67 Aluminium chloride in acidified aqueous solution forms an ion having geometry

Options

1. Octahedral
2. Tetrahedral
3. Square planar
4. Trigonal bipyramidal

Question Type : **MCQ**
Question ID : **533543890**
Option 1 ID : **5335432904**
Option 2 ID : **5335432903**
Option 3 ID : **5335432905**
Option 4 ID : **5335432906**
Status : **Answered**
Chosen Option : **2**

Q.68

Match **List - I** with **List - II**.

	List - I		**List - II**
	Molecule		**Shape**
(A)	BrF_5	(I)	T-shape
(B)	H_2O	(II)	See saw
(C)	ClF_3	(III)	Bent
(D)	SF_4	(IV)	Square pyramidal

Choose the **correct** answer from the options given below :

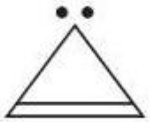
Options

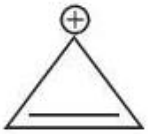
1. (A)-(III), (B)-(IV), (C)-(I), (D)-(II)
2. (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
3. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
4. (A)-(I), (B)-(II), (C)-(IV), (D)-(III)

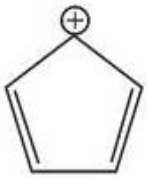
Question Type : **MCQ**
Question ID : **533543888**
Option 1 ID : **5335432896**
Option 2 ID : **5335432895**
Option 3 ID : **5335432897**
Option 4 ID : **5335432898**
Status : **Answered**
Chosen Option : **3**

Q.69 Which of the following molecule/species is most stable ?

Options

1. 

2. 

3. 

4.

Question Type : **MCQ**
Question ID : **533543897**
Option 1 ID : **5335432933**
Option 2 ID : **5335432934**
Option 3 ID : **5335432932**
Option 4 ID : **5335432931**
Status : **Answered**
Chosen Option : **3**

Q.70 Compound A formed in the following reaction reacts with B gives the product C. Find out A and B.

$$CH_3-C\equiv CH + Na \longrightarrow A \xrightarrow{B} \underset{(C)}{CH_3-C\equiv C-CH_2-\underset{\underset{CH_3}{|}}{CH_2}} + NaBr$$

Options

1. $A = CH_3-CH=CH_2,\ B = CH_3-CH_2-CH_2-Br$

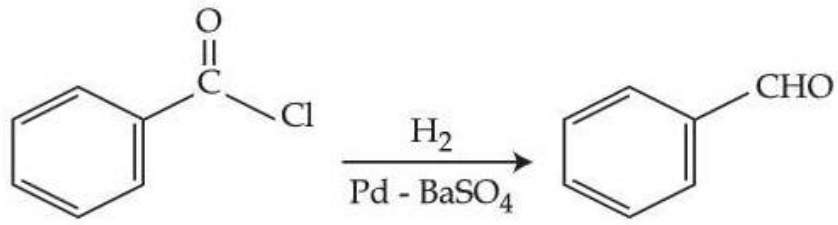
2. $A = CH_3-C\equiv \overset{-}{C}N\overset{+}{a},\ B = CH_3-CH_2-CH_2-Br$

3. $A = CH_3-CH_2-CH_3,\ B = CH_3-C\equiv CH$

4. $A = CH_3-C\equiv \overset{-}{C}N\overset{+}{a},\ B = CH_3-CH_2-CH_3$

Question Type : **MCQ**
Question ID : **533543898**
Option 1 ID : **5335432938**
Option 2 ID : **5335432935**
Option 3 ID : **5335432937**
Option 4 ID : **5335432936**
Status : **Answered**
Chosen Option : **2**

Q.71



This reduction reaction is known as :

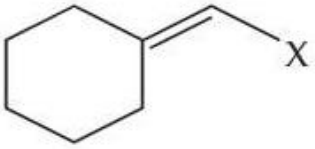
Options

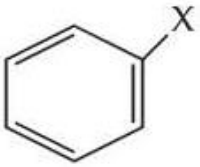
1. Wolff-Kishner reduction
2. Etard reduction
3. Stephen reduction
4. Rosenmund reduction

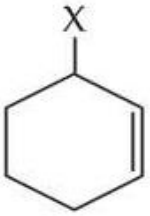
Question Type : **MCQ**
Question ID : **533543902**
Option 1 ID : **5335432952**
Option 2 ID : **5335432951**
Option 3 ID : **5335432953**
Option 4 ID : **5335432954**
Status : **Not Answered**
Chosen Option : **--**

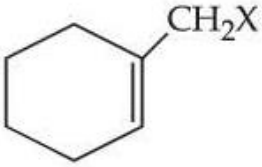
Q.72 Example of vinylic halide is :

Options

1. 

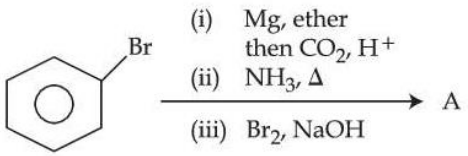
2. 

3. 

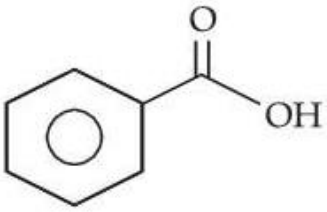
4. 

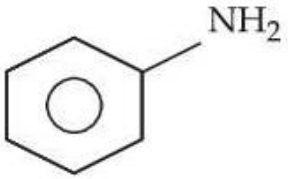
Question Type : **MCQ**
Question ID : **533543899**
Option 1 ID : **5335432941**
Option 2 ID : **5335432942**
Option 3 ID : **5335432940**
Option 4 ID : **5335432939**
Status : **Answered**
Chosen Option : **2**

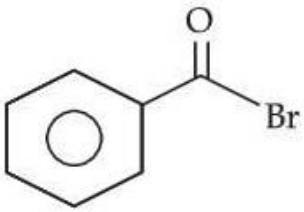
Q.73 The final product A, formed in the following multistep reaction sequence is :

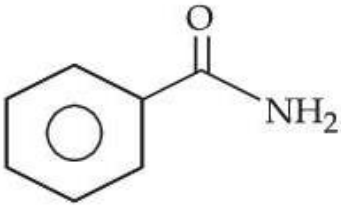


Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **533543903**
Option 1 ID : **5335432956**
Option 2 ID : **5335432958**
Option 3 ID : **5335432957**
Option 4 ID : **5335432955**
Status : **Not Answered**
Chosen Option : **--**

Q.74 Given below are two statements :

Statement (I) : The gas liberated on warming a salt with dil H_2SO_4, turns a piece of paper dipped in lead acetate into black, it is a confirmatory test for sulphide ion.

Statement (II) : In statement-I the colour of paper turns black because of formation of lead sulphite.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

1. Both **Statement I** and **Statement II** are false
2. **Statement I** is true but **Statement II** is false
3. **Statement I** is false but **Statement II** is true
4. Both **Statement I** and **Statement II** are true

Question Type : **MCQ**
Question ID : **533543905**
Option 1 ID : **5335432964**
Option 2 ID : **5335432965**
Option 3 ID : **5335432966**
Option 4 ID : **5335432963**
Status : **Answered**
Chosen Option : **4**

Q.75 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : There is a considerable increase in covalent radius from N to P. However from As to Bi only a small increase in covalent radius is observed.

Reason (R) : Covalent and ionic radii in a particular oxidation state increases down the group.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

1. Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**
2. **(A)** is true but **(R)** is false
3. **(A)** is false but **(R)** is true
4. Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

Question Type : **MCQ**
Question ID : **533543891**
Option 1 ID : **5335432908**
Option 2 ID : **5335432909**
Option 3 ID : **5335432910**
Option 4 ID : **5335432907**
Status : **Not Answered**
Chosen Option : **--**

Q.76 Given below are two statements :

Statement (I) : The orbitals having same energy are called as degenerate orbitals.

Statement (II) : In hydrogen atom, 3p and 3d orbitals are not degenerate orbitals.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

1. **Statement I** is false but **Statement II** is true
2. **Statement I** is true but **Statement II** is false
3. Both **Statement I** and **Statement II** are true
4. Both **Statement I** and **Statement II** are false

Question Type : **MCQ**
Question ID : **533543887**
Option 1 ID : **5335432894**
Option 2 ID : **5335432893**
Option 3 ID : **5335432891**
Option 4 ID : **5335432892**
Status : **Answered**
Chosen Option : **2**

Q.77 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : $CH_2=CH-CH_2-Cl$ is an example of allyl halide.

Reason (R) : Allyl halides are the compounds in which the halogen atom is attached to sp^2 hybridised carbon atom.

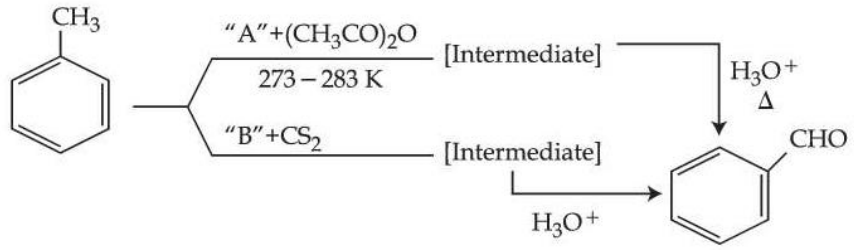
In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

1. **(A)** is false but **(R)** is true
2. Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**
3. Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**
4. **(A)** is true but **(R)** is false

Question Type : **MCQ**
Question ID : **533543900**
Option 1 ID : **5335432946**
Option 2 ID : **5335432944**
Option 3 ID : **5335432943**
Option 4 ID : **5335432945**
Status : **Answered**
Chosen Option : **1**

Q.78 In the given reactions, identify the reagent A and reagent B.



Options

1. A-CrO_3 B-CrO_2Cl_2
2. A-CrO_3 B-CrO_3
3. A-CrO_2Cl_2 B-CrO_3
4. A-CrO_2Cl_2 B-CrO_2Cl_2

Question Type : **MCQ**
Question ID : **533543901**
Option 1 ID : **5335432948**
Option 2 ID : **5335432947**
Option 3 ID : **5335432949**
Option 4 ID : **5335432950**
Status : **Not Answered**
Chosen Option : **--**

Q.79 Choose the correct statements from the following :

(A) Ethane-1, 2-diamine is a chelating ligand.
(B) Metallic aluminium is produced by electrolysis of aluminium oxide in presence of cryolite.
(C) Cyanide ion is used as ligand for leaching of silver.
(D) Phosphine act as a ligand in Wilkinson catalyst.
(E) The stability constants of Ca^{2+} and Mg^{2+} are similar with EDTA complexes.

Choose the **correct** answer from the options given below :

Options

1. (A), (D), (E) only
2. (A), (B), (C) only
3. (B), (C), (E) only
4. (C), (D), (E) only

Question Type : **MCQ**
Question ID : **533543894**
Option 1 ID : **5335432922**
Option 2 ID : **5335432921**
Option 3 ID : **5335432919**
Option 4 ID : **5335432920**
Status : **Not Answered**
Chosen Option : **--**

Q.80 Sugar which does not give reddish brown precipitate with Fehling's reagent, is :

Options

1. Maltose
2. Glucose
3. Sucrose
4. Lactose

Question Type : **MCQ**
Question ID : **533543904**
Option 1 ID : **5335432960**
Option 2 ID : **5335432959**
Option 3 ID : **5335432962**
Option 4 ID : **5335432961**
Status : **Not Answered**
Chosen Option : **--**

Section : **Chemistry Section B**

Q.81 The pH at which $Mg(OH)_2$ [$K_{sp} = 1 \times 10^{-11}$] begins to precipitate from a solution containing 0.10 M Mg^{2+} ions is _____.

Given Answer : **--**

Question Type : **SA**
Question ID : **533543910**
Status : **Not Answered**

Q.82 The rate of First order reaction is 0.04 mol L^{-1} s^{-1} at 10 minutes and 0.03 mol L^{-1} s^{-1} at 20 minutes after initiation. Half life of the reaction is _____ minutes. (Given log2 = 0.3010, log3 = 0.4771)

Given Answer : **--**

Question Type : **SA**
Question ID : **533543913**
Status : **Not Answered**

Q.83 The mass of sodium acetate (CH_3COONa) required to prepare 250 mL of 0.35 M aqueous solution is _____ g. (Molar mass of CH_3COONa is 82.02 g mol^{-1})

Given Answer : **--**

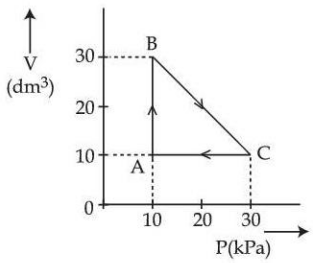
Question Type : **SA**
Question ID : **533543907**
Status : **Not Answered**

Q.84 If IUPAC name of an element is "Unununnium" then the element belongs to n^{th} group of Periodic table. The value of n is _____.

Given Answer : **1**

Question Type : **SA**
Question ID : **533543914**
Status : **Answered**

Q.85



An ideal gas undergoes a cyclic transformation starting from the point A and coming back to the same point by tracing the path A→B→C→A as shown in the diagram above. The total work done in the process is _____ J.

Given --
Answer :

Question Type : **SA**
Question ID : **533543909**
Status : **Not Answered**

Q.86 On a thin layer chromatographic plate, an organic compound moved by 3.5 cm, while the solvent moved by 5 cm. The retardation factor of the organic compound is _____ $\times 10^{-1}$.

Given --
Answer :

Question Type : **SA**
Question ID : **533543915**
Status : **Not Answered**

Q.87 $2MnO_4^- + bI^- + cH_2O \rightarrow x\ I_2 + yMnO_2 + z\overline{O}H$

If the above equation is balanced with integer coefficients, the value of z is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543911**
Status : **Not Answered**

Q.88 The total number of molecular orbitals formed from 2s and 2p atomic orbitals of a diatomic molecule is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543908**
Status : **Not Answered**

Q.89 The compound formed by the reaction of ethanal with semicarbazide contains _____ number of nitrogen atoms.

Given --
Answer :

Question Type : **SA**
Question ID : **533543916**
Status : **Not Answered**

Q.90 0.05 cm thick coating of silver is deposited on a plate of 0.05 m^2 area. The number of silver atoms deposited on plate are _____ $\times 10^{23}$. (At mass Ag = 108, d = 7.9 g cm^{-3})

Given --
Answer :

Question Type : **SA**
Question ID : **533543912**
Status : **Not Answered**