

JEE MAINS PAPER 1 2025

Application No	
Candidate Name	
Roll No	
Test Date	28/01/2025
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1

Let for some function $y = f(x)$, $\int_0^x t f(t) dt = x^2 f(x)$, $x > 0$
and $f(2) = 3$. Then $f(6)$ is equal to

Options 1. 3

2. 1

3. 6

4. 2

Question Type : MCQ

Question ID : 7364751518

Option 1 ID : 7364755171

Option 2 ID : 7364755169

Option 3 ID : 7364755172

Option 4 ID : 7364755170

Status : Not Answered

Chosen Option : -

Q.2

The sum, of the squares of all the roots of the equation $x^2 + |2x - 3| - 4 = 0$, is

Options 1. $3(2 - \sqrt{2})$

2. $6(2 - \sqrt{2})$

3. $3(3 - \sqrt{2})$

4. $6(3 - \sqrt{2})$

Question Type : MCQ

Question ID : 7364751504

Option 1 ID : 7364755114

Option 2 ID : 7364755113

Option 3 ID : 7364755116

Option 4 ID : 7364755115

Status : Not Answered

Chosen Option : -

Q.3 The sum of all local minimum values of the function

$$f(x) = \begin{cases} 1-2x, & x < -1 \\ \frac{1}{3}(7+2|x|), & -1 \leq x \leq 2 \\ \frac{11}{18}(x-4)(x-5), & x > 2 \end{cases}$$

is

Options

1. $\frac{167}{72}$
2. $\frac{171}{72}$
3. $\frac{131}{72}$
4. $\frac{157}{72}$

Question Type : MCQ

Question ID : 7364751516

Option 1 ID : 7364755161

Option 2 ID : 7364755164

Option 3 ID : 7364755162

Option 4 ID : 7364755163

Status : Not Answered

Chosen Option : -

Q.4 Let $\langle a_n \rangle$ be a sequence such that $a_0 = 0$, $a_1 = \frac{1}{2}$ and $2a_{n+2} = 5a_{n+1} - 3a_n$, $n = 0, 1, 2, 3, \dots$

Then $\sum_{k=1}^{100} a_k$ is equal to

Options

1. $3a_{99} + 100$
2. $3a_{99} - 100$
3. $3a_{100} + 100$
4. $3a_{100} - 100$

Question Type : MCQ

Question ID : 7364751505

Option 1 ID : 7364755117

Option 2 ID : 7364755118

Option 3 ID : 7364755119

Option 4 ID : 7364755120

Status : Not Answered

Chosen Option : -

Q.5

If the image of the point (4, 4, 3) in the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-1}{3}$ is (α, β, γ) , then $\alpha + \beta + \gamma$ is equal to

- Options
1. 9
 2. 7
 3. 8
 4. 12

Question Type : MCQ

Question ID : 7364751515

Option 1 ID : 7364755159

Option 2 ID : 7364755157

Option 3 ID : 7364755158

Option 4 ID : 7364755160

Status : Not Answered

Chosen Option : -

Q.6

$\cos\left(\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{33}{65}\right)$ is equal to:

- Options
1. $\frac{32}{65}$
 2. 1
 3. $\frac{33}{65}$
 4. 0

Question Type : MCQ

Question ID : 7364751513

Option 1 ID : 7364755151

Option 2 ID : 7364755150

Option 3 ID : 7364755152

Option 4 ID : 7364755149

Status : Not Answered

Chosen Option : -

Q.7 Three defective oranges are accidentally mixed with seven good ones and on looking at them, it is not possible to differentiate between them. Two oranges are drawn at random from the lot. If x denote the number of defective oranges, then the variance of x is

- Options
1. $26/75$
 2. $14/25$
 3. $28/75$
 4. $18/25$

Question Type : MCQ

Question ID : 7364751508

Option 1 ID : 7364755130

Option 2 ID : 7364755129

Option 3 ID : 7364755131

Option 4 ID : 7364755132

Status : Not Answered

Chosen Option : -

Q.8 Let the equation of the circle, which touches x-axis at the point $(a, 0)$, $a > 0$ and cuts off an intercept of length b on y-axis be $x^2 + y^2 - \alpha x + \beta y + \gamma = 0$. If the circle lies below x-axis, then the ordered pair $(2a, b^2)$ is equal to

- Options
1. $(\gamma, \beta^2 - 4\alpha)$
 2. $(\alpha, \beta^2 - 4\gamma)$
 3. $(\gamma, \beta^2 + 4\alpha)$
 4. $(\alpha, \beta^2 + 4\gamma)$

Question Type : MCQ

Question ID : 7364751512

Option 1 ID : 7364755148

Option 2 ID : 7364755146

Option 3 ID : 7364755147

Option 4 ID : 7364755145

Status : Not Answered

Chosen Option : -

Q.9 Let O be the origin, the point A be $z_1 = \sqrt{3} + 2\sqrt{2}i$, the point B (z_2) be such that $\sqrt{3}|z_2| = |z_1|$

and $\arg(z_2) = \arg(z_1) + \frac{\pi}{6}$. Then

Options 1. ABO is a scalene triangle

2. area of triangle ABO is $\frac{11}{4}$

3. ABO is an obtuse angled isosceles triangle

4. area of triangle ABO is $\frac{11}{\sqrt{3}}$

Question Type : MCQ

Question ID : 7364751503

Option 1 ID : 7364755110

Option 2 ID : 7364755112

Option 3 ID : 7364755109

Option 4 ID : 7364755111

Status : Not Answered

Chosen Option : -

Q.10 The area (in sq. units) of the region
 $\{(x, y) : 0 \leq y \leq 2|x| + 1, 0 \leq y \leq x^2 + 1, |x| \leq 3\}$ is

Options 1. $\frac{64}{3}$

2. $\frac{17}{3}$

3. $\frac{32}{3}$

4. $\frac{80}{3}$

Question Type : MCQ

Question ID : 7364751517

Option 1 ID : 7364755165

Option 2 ID : 7364755168

Option 3 ID : 7364755167

Option 4 ID : 7364755166

Status : Not Answered

Chosen Option : -

Q.11 Let ${}^nC_{r-1} = 28$, ${}^nC_r = 56$ and ${}^nC_{r+1} = 70$. Let A $(4\cos t, 4\sin t)$, B $(2\sin t, -2\cos t)$ and C $(3r - n, r^2 - n - 1)$ be the vertices of a triangle ABC, where t is a parameter. If $(3x - 1)^2 + (3y)^2 = \alpha$, is the locus of the centroid of triangle ABC, then α equals

- Options
1. 18
 2. 8
 3. 6
 4. 20

Question Type : MCQ

Question ID : 7364751511

Option 1 ID : 7364755142

Option 2 ID : 7364755143

Option 3 ID : 7364755144

Option 4 ID : 7364755141

Status : Not Answered

Chosen Option : -

Q.12 The number of different 5 digit numbers greater than 50000 that can be formed using the digits 0, 1, 2, 3, 4, 5, 6, 7, such that the sum of their first and last digits should not be more than 8, is

- Options
1. 5719
 2. 4608
 3. 5720
 4. 4607

Question Type : MCQ

Question ID : 7364751507

Option 1 ID : 7364755127

Option 2 ID : 7364755126

Option 3 ID : 7364755128

Option 4 ID : 7364755125

Status : Not Answered

Chosen Option : -

Q.13

If $f(x) = \frac{2^x}{2^x + \sqrt{2}}$, $x \in \mathbb{R}$, then

$\sum_{k=1}^{81} f\left(\frac{k}{82}\right)$ is equal to

Options 1. 82

2. $\frac{81}{2}$

3. 41

4. $81\sqrt{2}$

Question Type : MCQ

Question ID : 7364751502

Option 1 ID : 7364755107

Option 2 ID : 7364755106

Option 3 ID : 7364755105

Option 4 ID : 7364755108

Status : Not Answered

Chosen Option : -

Q.14 Two number k_1 and k_2 are randomly chosen from the set of natural numbers. Then, the probability that the value of $i^{k_1} + i^{k_2}$, ($i = \sqrt{-1}$) is non-zero, equals

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

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

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

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

Question Type : MCQ

Question ID : 7364751509

Option 1 ID : 7364755135

Option 2 ID : 7364755134

Option 3 ID : 7364755136

Option 4 ID : 7364755133

Status : Not Answered

Chosen Option : -

- Q.15** Let A (x, y, z) be a point in xy- plane, which is equidistant from three points (0, 3, 2), (2, 0, 3) and (0, 0, 1).
 Let B = (1, 4, -1) and C = (2, 0, -2). Then among the statements
 (S1) : ΔABC is an isosceles right angled triangle, and
 (S2) : the area of ΔABC is $\frac{9\sqrt{2}}{2}$,

- Options**
1. only (S1) is true
 2. both are true
 3. only (S2) is true
 4. both are false

Question Type : MCQ

Question ID : 7364751514

Option 1 ID : 7364755155

Option 2 ID : 7364755153

Option 3 ID : 7364755156

Option 4 ID : 7364755154

Status : Not Answered

Chosen Option : -

- Q.16** Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by

$$f(x) = (2 + 3a)x^2 + \left(\frac{a+2}{a-1} \right)x + b, a \neq 1. \text{ If}$$

$$f(x+y) = f(x) + f(y) + 1 - \frac{2}{7}xy, \text{ then the value of } 28 \sum_{i=1}^5 |f(i)| \text{ is}$$

- Options**
1. 715
 2. 735
 3. 545
 4. 675

Question Type : MCQ

Question ID : 7364751519

Option 1 ID : 7364755175

Option 2 ID : 7364755176

Option 3 ID : 7364755173

Option 4 ID : 7364755174

Status : Not Answered

Chosen Option : -

Q.17

If $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{96x^2 \cos^2 x}{(1+e^x)} dx = \pi(\alpha\pi^2 + \beta)$, $\alpha, \beta \in \mathbb{Z}$,
 then $(\alpha + \beta)^2$ equals

- Options
1. 100
 2. 64
 3. 144
 4. 196

Question Type : MCQ

Question ID : 7364751520

Option 1 ID : 7364755178

Option 2 ID : 7364755177

Option 3 ID : 7364755179

Option 4 ID : 7364755180

Status : Not Answered

Chosen Option : -

Q.18

Let T_r be the r^{th} term of an A.P. If for some m , $T_m = \frac{1}{25}$, $T_{25} = \frac{1}{20}$, and $20 \sum_{r=1}^{25} T_r = 13$, then

$5m \sum_{r=m}^{2m} T_r$ is equal to

- Options
1. 112
 2. 142
 3. 126
 4. 98

Question Type : MCQ

Question ID : 7364751506

Option 1 ID : 7364755122

Option 2 ID : 7364755124

Option 3 ID : 7364755123

Option 4 ID : 7364755121

Status : Not Answered

Chosen Option : -

Q.19 Let ABCD be a trapezium whose vertices lie on the parabola $y^2 = 4x$. Let the sides AD and BC of the trapezium be parallel to y-axis. If the diagonal AC is of length $\frac{25}{4}$ and it passes through the point (1, 0), then the area of ABCD is

- Options
1. $\frac{125}{8}$
 2. $\frac{75}{8}$
 3. $\frac{25}{2}$
 4. $\frac{75}{4}$

Question Type : MCQ
 Question ID : 7364751510
 Option 1 ID : 7364755140
 Option 2 ID : 7364755139
 Option 3 ID : 7364755137
 Option 4 ID : 7364755138
 Status : Not Answered
 Chosen Option : –

Q.20 The relation $R = \{(x, y) : x, y \in \mathbb{Z} \text{ and } x + y \text{ is even}\}$ is:

- Options
1. reflexive and transitive but not symmetric
 2. reflexive and symmetric but not transitive
 3. symmetric and transitive but not reflexive
 4. an equivalence relation

Question Type : MCQ
 Question ID : 7364751501
 Option 1 ID : 7364755101
 Option 2 ID : 7364755102
 Option 3 ID : 7364755103
 Option 4 ID : 7364755104
 Status : Not Answered
 Chosen Option : –

Q.21

$$\text{If } \alpha = 1 + \sum_{r=1}^6 (-3)^{r-1} {}^{12}C_{2r-1},$$

then the distance of the point $(12, \sqrt{3})$ from the line $\alpha x - \sqrt{3}y + 1 = 0$ is ____.

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751522

Status : Not Answered

Q.22

Let $E_1: \frac{x^2}{9} + \frac{y^2}{4} = 1$ be an ellipse. Ellipses E_i 's are constructed such that their centres and eccentricities are same as that of E_1 , and the length of minor axis of E_i is the length of major axis of E_{i+1} ($i \geq 1$). If A_i is the area of the ellipse E_i , then $\frac{5}{\pi} \left(\sum_{i=1}^{\infty} A_i \right)$, is equal to ____.

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751523

Status : Not Answered

Q.23

Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{d} = \vec{a} \times \vec{b}$. If $\vec{c}$ is a vector such that $\vec{a} \cdot \vec{c} = |\vec{c}|$, $|\vec{c} - 2\vec{a}|^2 = 8$ and the angle between $\vec{d}$ and $\vec{c}$ is $\frac{\pi}{4}$, then $|10 - 3\vec{b} \cdot \vec{c}| + |\vec{d} \times \vec{c}|^2$ is equal to ____.

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751524

Status : Not Answered

Q.24

$$\text{Let } f(x) = \begin{cases} 3x, & x < 0 \\ \min\{1+x+[x], x+2[x]\}, & 0 \leq x \leq 2 \\ 5, & x > 2, \end{cases}$$

where $[.]$ denotes greatest integer function. If α and β are the number of points, where f is not continuous and is not differentiable, respectively, then $\alpha + \beta$ equals ____.

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751525

Status : Not Answered

Q.25 Let M denote the set of all real matrices of order 3×3 and let $S = \{-3, -2, -1, 1, 2\}$. Let

$$S_1 = \{A = [a_{ij}] \in M : A = A^T \text{ and } a_{ij} \in S, \forall i, j\},$$

$$S_2 = \{A = [a_{ij}] \in M : A = -A^T \text{ and } a_{ij} \in S, \forall i, j\},$$

$$S_3 = \{A = [a_{ij}] \in M : a_{11} + a_{22} + a_{33} = 0 \text{ and } a_{ij} \in S, \forall i, j\}.$$

If $n(S_1 \cup S_2 \cup S_3) = 125\alpha$, then α equals ____.

Give –

n

Ans

wer :

Question Type : SA

Question ID : 7364751521

Status : Not Answered

Section : Physics Section A

Q.26 Consider a long thin conducting wire carrying a uniform current I . A particle having mass “ M ” and charge “ q ” is released at a distance “ a ” from the wire with a speed v_0 along the direction of current in the wire. The particle gets attracted to the wire due to magnetic force. The particle turns round when it is at distance x from the wire. The value of x is
[μ_0 is vacuum permeability]

Options

1. $\frac{a}{2}$

2. $a \left[1 - \frac{mv_0}{q\mu_0 I} \right]$

3. $ae^{-\frac{4\pi mv_0}{q\mu_0 I}}$

4. $a \left[1 - \frac{mv_0}{2q\mu_0 I} \right]$

Question Type : MCQ

Question ID : 7364751535

Option 1 ID : 7364755223

Option 2 ID : 7364755224

Option 3 ID : 7364755222

Option 4 ID : 7364755225

Status : Not Answered

Chosen Option : –

Q.27 A thin prism P_1 with angle 4° made of glass having refractive index 1.54, is combined with another thin prism P_2 made of glass having refractive index 1.72 to get dispersion without deviation. The angle of the prism P_2 in degrees is

- Options
1. 1.5
 2. 3
 3. $16/3$
 4. 4

Question Type : MCQ

Question ID : 7364751542

Option 1 ID : 7364755253

Option 2 ID : 7364755250

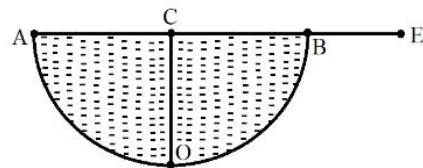
Option 3 ID : 7364755251

Option 4 ID : 7364755252

Status : Answered

Chosen Option : 2

Q.28 A hemispherical vessel is completely filled with a liquid of refractive index μ . A small coin is kept at the lowest point (O) of the vessel as shown in figure. The minimum value of the refractive index of the liquid so that a person can see the coin from point E (at the level of the vessel) is



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

Question Type : MCQ

Question ID : 7364751541

Option 1 ID : 7364755247

Option 2 ID : 7364755248

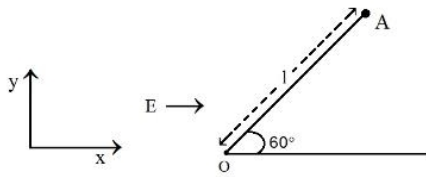
Option 3 ID : 7364755249

Option 4 ID : 7364755246

Status : Not Answered

Chosen Option : -

Q.29 A particle of mass 'm' and charge 'q' is fastened to one end 'A' of a massless string having equilibrium length l , whose other end is fixed at point 'O'. The whole system is placed on a frictionless horizontal plane and is initially at rest. If uniform electric field is switched on along the direction as shown in figure, then the speed of the particle when it crosses the x-axis is



Options

1. $\sqrt{\frac{qEl}{m}}$
2. $\sqrt{\frac{2qEl}{m}}$
3. $\sqrt{\frac{qEl}{4m}}$
4. $\sqrt{\frac{qEl}{2m}}$

Question Type : MCQ

Question ID : 7364751537

Option 1 ID : 7364755231

Option 2 ID : 7364755230

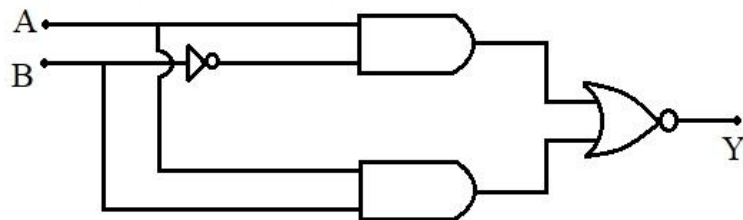
Option 3 ID : 7364755233

Option 4 ID : 7364755232

Status : Answered

Chosen Option : 4

Q.30 Which of the following circuits has the same output as that of the given circuit?



Options

1.

```
graph LR; A((A)) --- AND1[AND]; B((B)) --- AND1; AND1 --- Y((Y))
```
2.

```
graph LR; A((A)) --- AND1[AND]; B((B)) --- AND1; AND1 --- Y((Y))
```
3.

```
graph LR; B((B)) --- AND1[AND]; A((A)) --- AND1; AND1 --- Y((Y))
```
4.

```
graph LR; A((A)) --- AND1[AND]; B((B)) --- AND1; AND1 --- INV[Inverter]; INV --- Y((Y))
```

Question Type : MCQ

Question ID : 7364751545

Option 1 ID : 7364755263

Option 2 ID : 7364755264

Option 3 ID : 7364755262

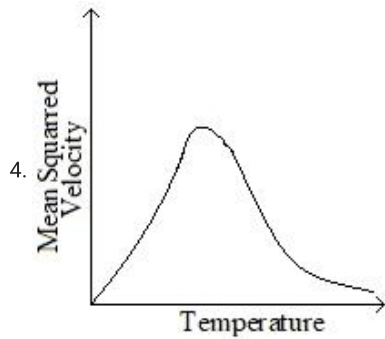
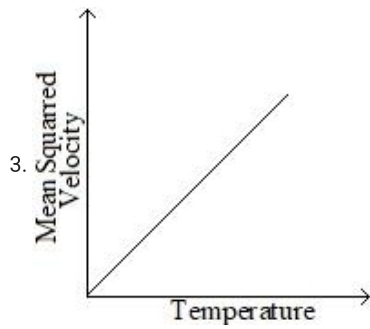
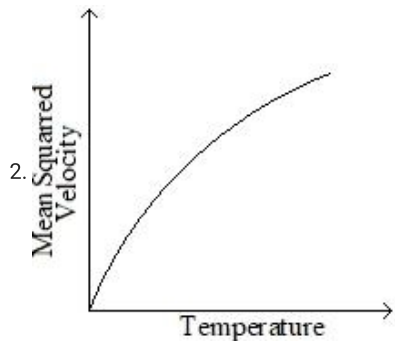
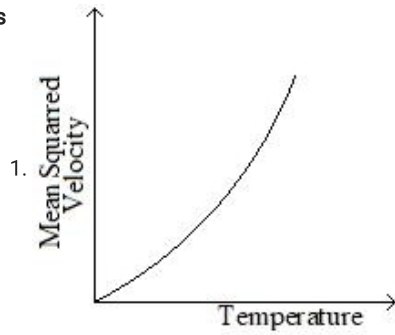
Option 4 ID : 7364755265

Status : Answered

Chosen Option : 1

Q.31 For a particular ideal gas which of the following graphs represents the variation of mean squared velocity of the gas molecules with temperature?

Options



Question Type : MCQ

Question ID : 7364751531

Option 1 ID : 7364755209

Option 2 ID : 7364755208

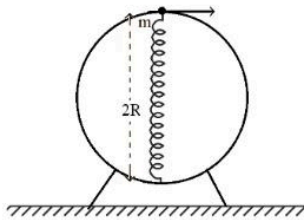
Option 3 ID : 7364755206

Option 4 ID : 7364755207

Status : Answered

Chosen Option : 2

- Q.32** A bead of mass 'm' slides without friction on the wall of a vertical circular hoop of radius 'R' as shown in figure. The bead moves under the combined action of gravity and a massless spring (k) attached to the bottom of the hoop. The equilibrium length of the spring is 'R'. If the bead is released from top of the hoop with (negligible) zero initial speed, velocity of bead, when the length of spring becomes 'R', would be (spring constant is 'k', g is acceleration due to gravity)



Options

1. $\sqrt{3Rg + \frac{kR^2}{m}}$
2. $\sqrt{2Rg + \frac{kR^2}{m}}$
3. $2\sqrt{gR + \frac{kR^2}{m}}$
4. $\sqrt{2Rg + \frac{4kR^2}{m}}$

Question Type : **MCQ**

Question ID : **7364751527**

Option 1 ID : **7364755193**

Option 2 ID : **7364755192**

Option 3 ID : **7364755190**

Option 4 ID : **7364755191**

Status : **Answered**

Chosen Option : **4**

Q.33 Due to presence of an em-wave whose electric component is given by $E = 100 \sin(\omega t - kx) \text{ NC}^{-1}$, a cylinder of length 200 cm holds certain amount of em-energy inside it. If another cylinder of same length but half diameter than previous one holds same amount of em-energy, the magnitude of the electric field of the corresponding em-wave should be modified as

- Options
1. $200 \sin(\omega t - kx) \text{ NC}^{-1}$
 2. $25 \sin(\omega t - kx) \text{ NC}^{-1}$
 3. $50 \sin(\omega t - kx) \text{ NC}^{-1}$
 4. $400 \sin(\omega t - kx) \text{ NC}^{-1}$

Question Type : **MCQ**

Question ID : **7364751540**

Option 1 ID : **7364755243**

Option 2 ID : **7364755244**

Option 3 ID : **7364755242**

Option 4 ID : **7364755245**

Status : **Answered**

Chosen Option : **4**

Q.34 Three infinitely long wires with linear charge density λ are placed along the x-axis, y-axis and z-axis respectively. Which of the following denotes an equipotential surface?

- Options
1. $(x + y)(y + z)(z + x) = \text{constant}$
 2. $xyz = \text{constant}$
 3. $xy + yz + zx = \text{constant}$
 4. $(x^2 + y^2)(y^2 + z^2)(z^2 + x^2) = \text{constant}$

Question Type : **MCQ**

Question ID : **7364751539**

Option 1 ID : **7364755239**

Option 2 ID : **7364755238**

Option 3 ID : **7364755241**

Option 4 ID : **7364755240**

Status : **Not Answered**

Chosen Option : **-**

Q.35 Consider following statements:

- A. Surface tension arises due to extra energy of the molecules at the interior as compared to the molecules at the surface, of a liquid.
- B. As the temperature of liquid rises, the coefficient of viscosity increases.
- C. As the temperature of gas increases, the coefficient of viscosity increases
- D. The onset of turbulence is determined by Reynold's number.
- E. In a steady flow two stream lines never intersect.

Choose the correct answer from the options given below:

- Options
- 1. A, B, C Only
 - 2. C, D, E Only
 - 3. B, C, D Only
 - 4. A, D, E Only

Question Type : MCQ

Question ID : 7364751529

Option 1 ID : 7364755200

Option 2 ID : 7364755199

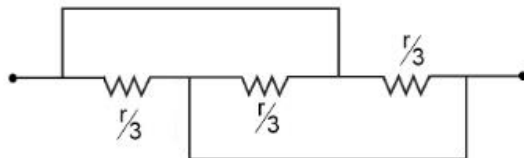
Option 3 ID : 7364755201

Option 4 ID : 7364755198

Status : Answered

Chosen Option : 4

Q.36 Find the equivalent resistance between two ends of the following circuit



- Options
- 1. $\frac{r}{6}$
 - 2. r
 - 3. $\frac{r}{9}$
 - 4. $\frac{r}{3}$

Question Type : MCQ

Question ID : 7364751536

Option 1 ID : 7364755229

Option 2 ID : 7364755228

Option 3 ID : 7364755226

Option 4 ID : 7364755227

Status : Answered

Chosen Option : 4

Q.37 Choose the correct nuclear process from the below options

[p: proton, n: neutron, e^- : electron, e^+ : positron, ν : neutrino, $\bar{\nu}$: antineutrino]

- Options
1. $n \rightarrow p + e^- + \nu$
 2. $n \rightarrow p + e^+ + \bar{\nu}$
 3. $n \rightarrow p + e^- + \bar{\nu}$
 4. $n \rightarrow p + e^+ + \nu$

Question Type : MCQ

Question ID : 7364751544

Option 1 ID : 7364755258

Option 2 ID : 7364755259

Option 3 ID : 7364755260

Option 4 ID : 7364755261

Status : Not Answered

Chosen Option : -

Q.38 A Carnot engine (E) is working between two temperatures 473K and 273K. In a new system two engines - engine E_1 works between 473K to 373K and engine E_2 works between 373K to 273K.

If η_{12} , η_1 and η_2 are the efficiencies of the engines E, E_1 and E_2 , respectively, then

- Options
1. $\eta_{12} < \eta_1 + \eta_2$
 2. $\eta_{12} = \eta_1 + \eta_2$
 3. $\eta_{12} = \eta_1 \eta_2$
 4. $\eta_{12} \geq \eta_1 + \eta_2$

Question Type : MCQ

Question ID : 7364751532

Option 1 ID : 7364755213

Option 2 ID : 7364755210

Option 3 ID : 7364755212

Option 4 ID : 7364755211

Status : Answered

Chosen Option : 4

Q.39 Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A: A sound wave has higher speed in solids than gases.

Reason R: Gases have higher value of Bulk modulus than solids.

In the light of the above statements, choose the **correct** answer from the options given below

Options 1. **A is false but R is true**

2. **Both A and R are true and R is the correct explanation of A**

3.

Both A and R are true but R is NOT the correct explanation of A

4. **A is true but R is false**

Question Type : **MCQ**

Question ID : **7364751533**

Option 1 ID : **7364755217**

Option 2 ID : **7364755214**

Option 3 ID : **7364755215**

Option 4 ID : **7364755216**

Status : **Not Answered**

Chosen Option : **—**

Q.40 In the experiment for measurement of viscosity ' η ' of given liquid with a ball having radius R, consider following statements.

A. Graph between terminal velocity V and R will be a parabola.

B. The terminal velocities of different diameter balls are constant for a given liquid.

C. Measurement of terminal velocity is dependent on the temperature.

D. This experiment can be utilized to assess the density of a given liquid.

E. If balls are dropped with some initial speed, the value of η will change.

Choose the correct answer from the options given below:

Options 1. **B, D and E Only**

2. **C, D and E Only**

3. **A, B and E Only**

4. **A, C and D Only**

Question Type : **MCQ**

Question ID : **7364751530**

Option 1 ID : **7364755203**

Option 2 ID : **7364755204**

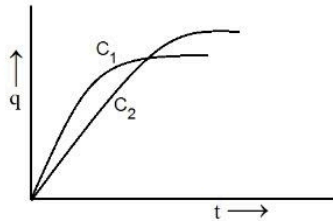
Option 3 ID : **7364755205**

Option 4 ID : **7364755202**

Status : **Answered**

Chosen Option : **1**

Q.41 Two capacitors C_1 and C_2 are connected in parallel to a battery. Charge-time graph is shown below for the two capacitors. The energy stored with them are U_1 and U_2 , respectively. Which of the given statements is true?



- Options
1. $C_1 > C_2, U_1 < U_2$
 2. $C_2 > C_1, U_2 > U_1$
 3. $C_2 > C_1, U_2 < U_1$
 4. $C_1 > C_2, U_1 > U_2$

Question Type : MCQ

Question ID : 7364751538

Option 1 ID : 7364755235

Option 2 ID : 7364755236

Option 3 ID : 7364755237

Option 4 ID : 7364755234

Status : Answered

Chosen Option : 3

Q.42 A wire of resistance R is bent into an equilateral triangle and an identical wire is bent into a square. The ratio of resistance between the two end points of an edge of the triangle to that of the square is

- Options
1. $9/8$
 2. $27/32$
 3. $32/27$
 4. $8/9$

Question Type : MCQ

Question ID : 7364751534

Option 1 ID : 7364755219

Option 2 ID : 7364755221

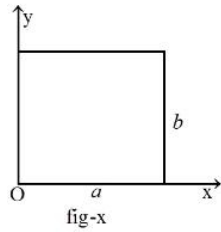
Option 3 ID : 7364755220

Option 4 ID : 7364755218

Status : Answered

Chosen Option : 3

Q.43 The center of mass of a thin rectangular plate (fig - x) with sides of length a and b , whose mass per unit area (σ) varies as $\sigma = \frac{\sigma_0 x}{ab}$ (where σ_0 is a constant), would be _____



Options

1. $\left(\frac{2}{3}a, \frac{2}{3}b\right)$
2. $\left(\frac{1}{3}a, \frac{b}{2}\right)$
3. $\left(\frac{a}{2}, \frac{b}{2}\right)$
4. $\left(\frac{2}{3}a, \frac{b}{2}\right)$

Question Type : MCQ

Question ID : 7364751526

Option 1 ID : 7364755188

Option 2 ID : 7364755189

Option 3 ID : 7364755186

Option 4 ID : 7364755187

Status : Answered

Chosen Option : 1

Q.44 Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A: In a central force field, the work done is independent of the path chosen.

Reason R: Every force encountered in mechanics does not have an associated potential energy.

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

- Options
1. **A** is true but **R** is false
 2. Both **A** and **R** are true and **R** is the correct explanation of **A**
 3. Both **A** and **R** are true but **R** is **NOT** the correct explanation of **A**
 4. **A** is false but **R** is true

Question Type : MCQ

Question ID : 7364751528

Option 1 ID : 7364755196

Option 2 ID : 7364755194

Option 3 ID : 7364755195

Option 4 ID : 7364755197

Status : Answered

Chosen Option : 1

Q.45 A proton of mass ' m_p ' has same energy as that of a photon of wavelength ' λ '. If the proton is moving at non-relativistic speed, then ratio of its de Broglie wavelength to the wavelength of photon is.

Options

1. $\frac{1}{c} \sqrt{\frac{E}{2m_p}}$

2. $\frac{1}{c} \sqrt{\frac{E}{m_p}}$

3. $\frac{1}{2c} \sqrt{\frac{E}{m_p}}$

4. $\frac{1}{c} \sqrt{\frac{2E}{m_p}}$

Question Type : MCQ

Question ID : 7364751543

Option 1 ID : 7364755255

Option 2 ID : 7364755254

Option 3 ID : 7364755256

Option 4 ID : 7364755257

Status : Not Answered

Chosen Option : -

Q.46 In a measurement, it is asked to find modulus of elasticity per unit torque applied on the system.

The measured quantity has dimension of $[M^a L^b T^c]$. If $b = 3$, the value of c is _____

Give 0
n
Ans
wer :

Question Type : SA

Question ID : 7364751546

Status : Answered

Q.47 A tiny metallic rectangular sheet has length and breadth of 5 mm and 2.5 mm, respectively. Using a specially designed screw gauge which has pitch of 0.75 mm and 15 divisions in the circular scale, you are asked to find the area of the sheet. In this measurement, the maximum fractional error will be $\frac{x}{100}$ where x is _____ .

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751547

Status : Not Answered

Q.48 The moment of inertia of a solid disc rotating along its diameter is 2.5 times higher than the moment of inertia of a ring rotating in similar way. The moment of inertia of a solid sphere which has same radius as the disc and rotating in similar way, is n times higher than the moment of inertia of the given ring. Here, $n = \underline{\hspace{1cm}}$.
Consider all the bodies have equal masses.

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751549

Status : Not Attempted and
Marked For Review

Q.49 Two iron solid discs of negligible thickness have radii R_1 and R_2 and moment of inertia I_1 and I_2 , respectively. For $R_2 = 2R_1$, the ratio of I_1 and I_2 would be $1/x$, where $x = \underline{\hspace{1cm}}$.

Give 4
n
Ans
wer :

Question Type : SA

Question ID : 7364751548

Status : Answered

Q.50 A double slit interference experiment performed with a light of wavelength 600 nm forms an interference fringe pattern on a screen with 10th bright fringe having its centre at a distance of 10 mm from the central maximum. Distance of the centre of the same 10th bright fringe from the central maximum when the source of light is replaced by another source of wavelength 660 nm would be _____mm.

Give 11

n

Ans

wer :

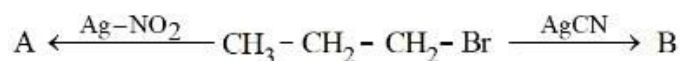
Question Type : SA

Question ID : 7364751550

Status : Answered

Section : Chemistry Section A

Q.51 The products A and B in the following reactions, respectively are



- Options
1. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NO}_2$, $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NC}$
 2. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{ONO}$, $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CN}$
 3. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NO}_2$, $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CN}$
 4. $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{ONO}$, $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{NC}$

Question Type : MCQ

Question ID : 7364751566

Option 1 ID : 7364755334

Option 2 ID : 7364755332

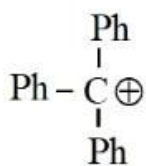
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Option 4 ID : 7364755333

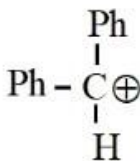
Status : Answered

Chosen Option : 1

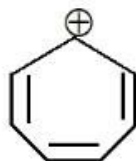
Q.52 The correct order of stability of following carbocations is :



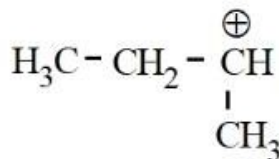
A



B



C



D

- Options
1. $\text{C} > \text{B} > \text{A} > \text{D}$
 2. $\text{A} > \text{B} > \text{C} > \text{D}$
 3. $\text{B} > \text{C} > \text{A} > \text{D}$
 4. $\text{C} > \text{A} > \text{B} > \text{D}$

Question Type : MCQ

Question ID : 7364751564

Option 1 ID : 7364755325

Option 2 ID : 7364755324

Option 3 ID : 7364755326

Option 4 ID : 7364755323

Status : Answered

Chosen Option : 4

Q.53 Given below are two statements:

Statement I: In the oxalic acid vs KMnO_4 (in the presence of dil H_2SO_4) titration the solution needs to be heated initially to 60°C , but no heating is required in Ferrous ammonium sulphate (FAS) vs KMnO_4 titration (in the presence of dil H_2SO_4)

Statement II: In oxalic acid vs KMnO_4 titration, the initial formation of MnSO_4 takes place at high temperature, which then acts as catalyst for further reaction. In the case of FAS vs KMnO_4 , heating oxidizes Fe^{2+} into Fe^{3+} by oxygen of air and error may be introduced in the experiment.

In the light of the above statements, choose the **correct** answer from the options given below

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

Question Type : MCQ

Question ID : 7364751570

Option 1 ID : 7364755348

Option 2 ID : 7364755347

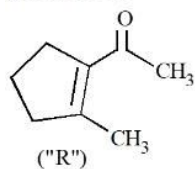
Option 3 ID : 7364755350

Option 4 ID : 7364755349

Status : Answered

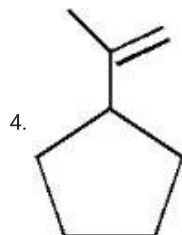
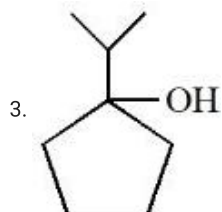
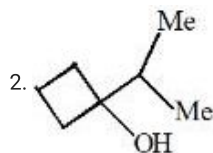
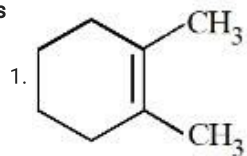
Chosen Option : 2

Q.54 A molecule ("P") on treatment with acid undergoes rearrangement and gives ("Q"). ("Q") on ozonolysis followed by reflux under alkaline condition gives ("R"). The structure of ("R") is given below.



The structure of ("P") is

Options



Question Type : MCQ

Question ID : 7364751565

Option 1 ID : 7364755329

Option 2 ID : 7364755328

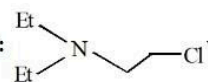
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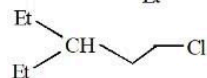
Option 4 ID : 7364755330

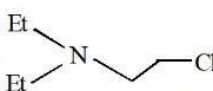
Status : Answered

Chosen Option : 3

Q.55 Given below are two statements:

Statement I:  will undergo alkaline hydrolysis at a faster rate than



Statement II: In , intramolecular substitution takes place first by involving lone pair of electrons on nitrogen.

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 incorrect
 2. Both Statement I and Statement II are correct
 3. Statement I is correct but Statement II is incorrect
 4. Statement I is incorrect but Statement II is correct

Question Type : MCQ

Question ID : 7364751563

Option 1 ID : 7364755320

Option 2 ID : 7364755319

Option 3 ID : 7364755321

Option 4 ID : 7364755322

Status : Not Answered

Chosen Option : -

Q.56 In a multielectron atom, which of the following orbitals described by three quantum numbers will have same energy in absence of electric and magnetic fields?

- A. $n = 1, l = 0, m_l = 0$
B. $n = 2, l = 0, m_l = 0$
C. $n = 2, l = 1, m_l = 1$
D. $n = 3, l = 2, m_l = 1$
E. $n = 3, l = 2, m_l = 0$

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

- Options**
1. D and E Only
 2. C and D Only
 3. B and C Only
 4. A and B Only

Question Type : MCQ

Question ID : 7364751551

Option 1 ID : 7364755271

Option 2 ID : 7364755272

Option 3 ID : 7364755273

Option 4 ID : 7364755274

Status : Answered

Chosen Option : 1

Q.57 Given below are two statements:

Statement I : D-glucose pentaacetate reacts with 2, 4 – dinitrophenylhydrazine

Statement II : Starch, on heating with concentrated sulfuric acid at 100°C and 2 - 3 atmosphere pressure produces glucose.

In the light of the above statements, choose the **correct** answer from the options given below

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

Question Type : MCQ

Question ID : 7364751569

Option 1 ID : 7364755343

Option 2 ID : 7364755346

Option 3 ID : 7364755345

Option 4 ID : 7364755344

Status : Answered

Chosen Option : 2

Q.58 Both acetaldehyde and acetone (individually) undergo which of the following reactions?

- A. Iodoform Reaction
- B. Cannizaro Reaction
- C. Aldol Condensation
- D. Tollen's Test
- E. Clemmensen Reduction

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

- Options
1. B, C and D Only
 2. A, C and E Only
 3. C and E Only
 4. A, B and D Only

Question Type : MCQ

Question ID : 7364751567

Option 1 ID : 7364755337

Option 2 ID : 7364755335

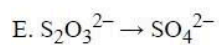
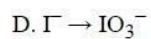
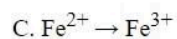
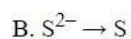
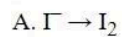
Option 3 ID : 7364755336

Option 4 ID : 7364755338

Status : Answered

Chosen Option : 1

Q.59 Which of the following oxidation reactions are carried out by both $\text{K}_2\text{Cr}_2\text{O}_7$ and KMnO_4 in acidic medium?



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

Options 1. A, D and E Only

2. A, B and C Only

3. B, C and D Only

4. C, D and E Only

Question Type : MCQ

Question ID : 7364751560

Option 1 ID : 7364755310

Option 2 ID : 7364755307

Option 3 ID : 7364755308

Option 4 ID : 7364755309

Status : Answered

Chosen Option : 4

Q.60 Match the **LIST-I** with **LIST-II**

LIST-I (Redox Reaction)		LIST-II (Type of Redox Reaction)	
A.	$\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \xrightarrow{\Delta} \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$	I.	Disproportionation reaction
B.	$2\text{NaH}(\text{s}) \xrightarrow{\Delta} 2\text{Na}(\text{s}) + \text{H}_2(\text{g})$	II.	Combination reaction
C.	$\text{V}_2\text{O}_5(\text{s}) + 5\text{Ca}(\text{s}) \xrightarrow{\Delta} 2\text{V}(\text{s}) + 5\text{CaO}(\text{s})$	III.	Decomposition reaction
D.	$2\text{H}_2\text{O}_2(\text{aq}) \xrightarrow{\Delta} 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$	IV.	Displacement reaction

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

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

Question Type : MCQ

Question ID : 7364751556

Option 1 ID : 7364755292

Option 2 ID : 7364755293

Option 3 ID : 7364755294

Option 4 ID : 7364755291

Status : Answered

Chosen Option : 2

Q.61 Consider the following elements In, Tl, Al, Pb, Sn and Ge.

The most stable oxidation states of elements with highest and lowest first ionisation enthalpies, respectively, are

- Options
1. +2 and +3
 2. +1 and +4
 3. +4 and +3
 4. +4 and +1

Question Type : MCQ

Question ID : 7364751559

Option 1 ID : 7364755304

Option 2 ID : 7364755303

Option 3 ID : 7364755306

Option 4 ID : 7364755305

Status : Answered

Chosen Option : 4

Q.62 The metal ion whose electronic configuration is not affected by the nature of the ligand and which gives a violet colour in non-luminous flame under hot condition in borax bead test is

- Options
1. Ti^{3+}
 2. Cr^{3+}
 3. Ni^{2+}
 4. Mn^{2+}

Question Type : MCQ

Question ID : 7364751562

Option 1 ID : 7364755317

Option 2 ID : 7364755316

Option 3 ID : 7364755315

Option 4 ID : 7364755318

Status : Answered

Chosen Option : 3

Q.63 A weak acid HA has degree of dissociation x . Which option gives the correct expression of $(\text{pH} - \text{pK}_a)$?

- Options
1. $\log (1 + 2x)$
 2. 0
 3. $\log \left(\frac{x}{1-x} \right)$
 4. $\log \left(\frac{1-x}{x} \right)$

Question Type : MCQ

Question ID : 7364751555

Option 1 ID : 7364755287

Option 2 ID : 7364755289

Option 3 ID : 7364755290

Option 4 ID : 7364755288

Status : Not Attempted and
Marked For Review

Chosen Option : -

Q.64 The molecules having square pyramidal geometry are

- Options
1. BrF_5 & XeOF_4
 2. SbF_5 & XeOF_4
 3. BrF_5 & PCl_5
 4. SbF_5 & PCl_5

Question Type : MCQ

Question ID : 7364751552

Option 1 ID : 7364755277

Option 2 ID : 7364755276

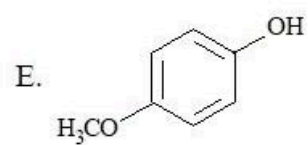
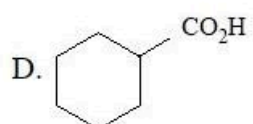
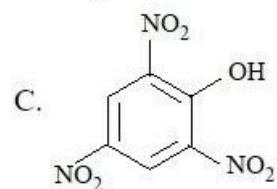
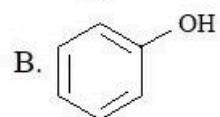
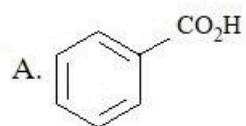
Option 3 ID : 7364755275

Option 4 ID : 7364755278

Status : Answered

Chosen Option : 1

Q.65 The compounds that produce CO_2 with aqueous NaHCO_3 solution are:



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

- Options
1. A and C Only
 2. A, B and E Only
 3. A, C and D Only
 4. A and B Only

Question Type : MCQ

Question ID : 7364751568

Option 1 ID : 7364755339

Option 2 ID : 7364755341

Option 3 ID : 7364755342

Option 4 ID : 7364755340

Status : Answered

Chosen Option : 1

Q.66 Consider 'n' is the number of lone pair of electrons present in the equatorial position of the most stable structure of ClF_3 . The ions from the following with 'n' number of unpaired electrons are

- A. V^{3+}
- B. Ti^{3+}
- C. Cu^{2+}
- D. Ni^{2+}
- E. Ti^{2+}

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

- Options
1. B and D Only
 2. B and C Only
 3. A, D and E Only
 4. A and C Only

Question Type : MCQ

Question ID : 7364751561

Option 1 ID : 7364755314

Option 2 ID : 7364755311

Option 3 ID : 7364755313

Option 4 ID : 7364755312

Status : Answered

Chosen Option : 3

Q.67 The incorrect decreasing order of atomic radii is

- Options
1. $\text{Mg} > \text{Al} > \text{C} > \text{O}$
 2. $\text{Al} > \text{B} > \text{N} > \text{F}$
 3. $\text{Be} > \text{Mg} > \text{Al} > \text{Si}$
 4. $\text{Si} > \text{P} > \text{Cl} > \text{F}$

Question Type : MCQ

Question ID : 7364751558

Option 1 ID : 7364755300

Option 2 ID : 7364755299

Option 3 ID : 7364755301

Option 4 ID : 7364755302

Status : Answered

Chosen Option : 3

Q.68 What is the freezing point depression constant of a solvent, 50 g of which contain 1 g non volatile solute (molar mass 256 g mol^{-1}) and the decrease in freezing point is 0.40 K ?

- Options
1. $5.12 \text{ K kg mol}^{-1}$
 2. $4.43 \text{ K kg mol}^{-1}$
 3. $1.86 \text{ K kg mol}^{-1}$
 4. $3.72 \text{ K kg mol}^{-1}$

Question Type : **MCQ**

Question ID : **7364751553**

Option 1 ID : **7364755281**

Option 2 ID : **7364755282**

Option 3 ID : **7364755279**

Option 4 ID : **7364755280**

Status : **Answered**

Chosen Option : **1**

Q.69 Ice and water are placed in a closed container at a pressure of 1 atm and temperature 273.15 K . If pressure of the system is increased 2 times, keeping temperature constant, then identify correct observation from following

- Options
1. Volume of system increases .
 2. The amount of ice decreases.
 3. Liquid phase disappears completely.
 4. The solid phase (ice) disappears completely.

Question Type : **MCQ**

Question ID : **7364751554**

Option 1 ID : **7364755286**

Option 2 ID : **7364755284**

Option 3 ID : **7364755283**

Option 4 ID : **7364755285**

Status : **Answered**

Chosen Option : **3**

Q.70

$[A]_0 / \text{mol L}^{-1}$	$t_{1/2} / \text{min}$
0.100	200
0.025	100

For a given reaction $R \rightarrow P$, $t_{1/2}$ is related to $[A]_0$ as given in table.

Given: $\log 2 = 0.30$

Which of the following is true?

- A. The order of the reaction is $\frac{1}{2}$.
- B. If $[A]_0$ is 1M, then $t_{1/2}$ is $200\sqrt{10}$ min
- C. The order of the reaction changes to 1 if the concentration of reactant changes from 0.100 M to 0.500 M.
- D. $t_{1/2}$ is 800 min for $[A]_0 = 1.6$ M

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

- Options
1. A, B and D Only
 2. A and B Only
 3. C and D Only
 4. A and C Only

Question Type : MCQ

Question ID : 7364751557

Option 1 ID : 7364755297

Option 2 ID : 7364755295

Option 3 ID : 7364755298

Option 4 ID : 7364755296

Status : Not Answered

Chosen Option : -

Section : Chemistry Section B

Q.71 The formation enthalpies, $\Delta H_f^\ominus$ for $H_{(g)}$ and $O_{(g)}$ are 220.0 and 250.0 kJ mol^{-1} , respectively, at 298.15 K, and $\Delta H_f^\ominus$ for $H_2O_{(g)}$ is $-242.0 \text{ kJ mol}^{-1}$ at the same temperature. The average bond enthalpy of the O-H bond in water at 298.15 K is _____ kJ mol^{-1} (nearest integer).

Give –
n
Ans
wer :

Question Type : SA

Question ID : 7364751572

Status : Not Answered

Q.72 Quantitative analysis of an organic compound (X) shows following % composition.

C : 14.5 % Cl : 64.46%

H : 1.8 %

(Empirical formula mass of the compound (X) is ____ $\times 10^{-1}$

(Given molar mass in g mol^{-1} of C : 12, H : 1, O : 16, Cl : 35.5)

Give **485**

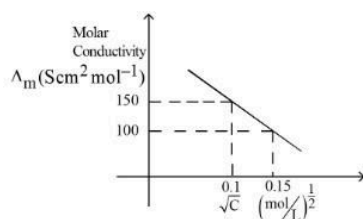
n
Ans
wer :

Question Type : SA

Question ID : 7364751574

Status : Answered

Q.73 Given below is the plot of the molar conductivity vs $\sqrt{\text{concentration}}$ for KCl in aqueous solution.



If, for the higher concentration of KCl solution, the resistance of the conductivity cell is 100Ω , then the resistance of the same cell with the dilute solution is 'x' Ω

The value of x is _____ (Nearest integer)

Give –

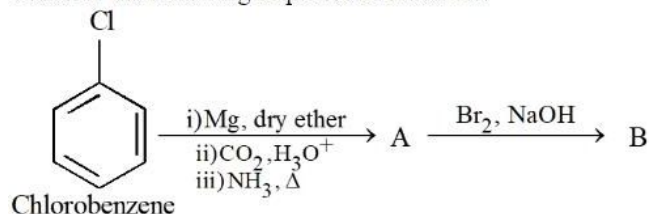
n
Ans
wer :

Question Type : SA

Question ID : 7364751573

Status : Not Answered

Q.74 Consider the following sequence of reactions:



11.25 mg of chlorobenzene will produce ---- $\times 10^{-1}$ mg of product B.
(Consider the reactions result in complete conversion.)

[Given molar mass of C, H, O, N and Cl as 12, 1, 16, 14 and 35.5 g mol^{-1} respectively]

Give –

n
Ans
wer :

Question Type : SA

Question ID : 7364751575

Status : Not Answered

Q.75 The molarity of a 70% (mass/mass) aqueous solution of a monobasic acid (X) is _____ $\times 10^{-1}$
M(Nearest integer)

[Given: Density of aqueous solution of (X) is 1.25 g mL^{-1}

Molar mass of the acid is 70 g mol^{-1}]

Give **125**

n

Ans

wer :

Question Type : SA

Question ID : 7364751571

Status : Answered