

JEE MAINS PAPER 1 2025

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Test Date	24/01/2025
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

- Q.1** A and B alternately throw a pair of dice. A wins if he throws a sum of 5 before B throws a sum of 8, and B wins if he throws a sum of 8 before A throws a sum of 5. The probability, that A wins if A makes the first throw, is

- Options
1. $\frac{8}{19}$
 2. $\frac{9}{19}$
 3. $\frac{8}{17}$
 4. $\frac{9}{17}$

Question Type : MCQ
 Question ID : 7364751058
 Option 1 ID : 7364753602
 Option 2 ID : 7364753600
 Option 3 ID : 7364753601
 Option 4 ID : 7364753599
 Status : Answered
 Chosen Option : 2

- Q.2** Let in a ΔABC , the length of the side AC be 6, the vertex B be $(1, 2, 3)$ and the vertices A, C lie on the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}$. Then the area (in sq. units) of ΔABC is:

- Options
1. 56
 2. 42
 3. 17
 4. 21

Question Type : MCQ
 Question ID : 7364751064
 Option 1 ID : 7364753626
 Option 2 ID : 7364753625
 Option 3 ID : 7364753623
 Option 4 ID : 7364753624
 Status : Answered
 Chosen Option : 4

Q.3 Let the lines $3x - 4y - \alpha = 0$, $8x - 11y - 33 = 0$, and $2x - 3y + \lambda = 0$ be concurrent. If the image of the point

(1, 2) in the line $2x - 3y + \lambda = 0$ is $\left(\frac{57}{13}, \frac{-40}{13}\right)$, then $|\alpha\lambda|$ is equal to

- Options 1. 101
2. 113
3. 84
4. 91

Question Type : MCQ
Question ID : 7364751059
Option 1 ID : 7364753603
Option 2 ID : 7364753606
Option 3 ID : 7364753604
Option 4 ID : 7364753605
Status : Not Answered
Chosen Option : --

Q.4 Let the line passing through the points $(-1, 2, 1)$ and parallel to the line $\frac{x-1}{2} = \frac{y+1}{3} = \frac{z}{4}$ intersect the line $\frac{x+2}{3} = \frac{y-3}{2} = \frac{z-4}{1}$ at the point P. Then the distance of P from the point Q $(4, -5, 1)$ is

- Options 1. 5
2. 10
3. $5\sqrt{6}$
4. $5\sqrt{5}$

Question Type : MCQ
Question ID : 7364751065
Option 1 ID : 7364753627
Option 2 ID : 7364753628
Option 3 ID : 7364753630
Option 4 ID : 7364753629
Status : Answered
Chosen Option : 4

Q.5 Consider the region $R = \left\{(x, y) : x \leq y \leq 9 - \frac{11}{3}x^2, x \geq 0\right\}$.

The area, of the largest rectangle of sides parallel to the coordinate axes and inscribed in R, is:

- Options 1. $\frac{821}{123}$
2. $\frac{567}{121}$
3. $\frac{730}{119}$
4. $\frac{625}{111}$

Question Type : MCQ
Question ID : 7364751067
Option 1 ID : 7364753638
Option 2 ID : 7364753635
Option 3 ID : 7364753637
Option 4 ID : 7364753636
Status : Not Answered
Chosen Option : --

Q.6 Let the product of the focal distances of the point $\left(\sqrt{3}, \frac{1}{2}\right)$ on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, ($a > b$),

be $\frac{7}{4}$. Then the absolute difference of the eccentricities of two such ellipses is

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

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

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

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

Question Type : MCQ

Question ID : 7364751061

Option 1 ID : 7364753612

Option 2 ID : 7364753613

Option 3 ID : 7364753611

Option 4 ID : 7364753614

Status : Not Answered

Chosen Option : --

Q.7

Let $f : \mathbb{R} - \{0\} \rightarrow \mathbb{R}$ be a function such that $f(x) - 6f\left(\frac{1}{x}\right) = \frac{35}{3x} - \frac{5}{2}$.

If the $\lim_{x \rightarrow 0} \left(\frac{1}{ax} + f(x) \right) = \beta$; $a, \beta \in \mathbb{R}$, then $a + 2\beta$ is equal to

Options 1. 6

2. 3

3. 4

4. 5

Question Type : MCQ

Question ID : 7364751066

Option 1 ID : 7364753634

Option 2 ID : 7364753631

Option 3 ID : 7364753632

Option 4 ID : 7364753633

Status : Answered

Chosen Option : 3

Q.8 If the system of equations

$$2x - y + z = 4$$

$$5x + \lambda y + 3z = 12$$

$$100x - 47y + \mu z = 212,$$

has infinitely many solutions, then $\mu - 2\lambda$ is equal to

Options 1. 57

2. 56

3. 55

4. 59

Question Type : **MCQ**

Question ID : **7364751054**

Option 1 ID : **7364753585**

Option 2 ID : **7364753584**

Option 3 ID : **7364753583**

Option 4 ID : **7364753586**

Status : **Answered**

Chosen Option : **1**

Q.9 The area of the region $\{(x, y) : x^2 + 4x + 2 \leq y \leq |x + 2|\}$ is equal to

Options 1. $20/3$

2. $24/5$

3. 7

4. 5

Question Type : **MCQ**

Question ID : **7364751069**

Option 1 ID : **7364753645**

Option 2 ID : **7364753644**

Option 3 ID : **7364753646**

Option 4 ID : **7364753643**

Status : **Not Attempted and
Marked For Review**

Chosen Option : **--**

Q.10 Let $y = y(x)$ be the solution of the differential equation

$$(xy - 5x^2 \sqrt{1+x^2})dx + (1+x^2)dy = 0, y(0) = 0. \text{ Then } y(\sqrt{3}) \text{ is equal to}$$

Options

1. $\frac{5\sqrt{3}}{2}$
2. $2\sqrt{2}$
3. $\sqrt{\frac{14}{3}}$
4. $\sqrt{\frac{15}{2}}$

Question Type : MCQ

Question ID : 7364751070

Option 1 ID : 7364753647

Option 2 ID : 7364753649

Option 3 ID : 7364753648

Option 4 ID : 7364753650

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.11 For a statistical data x_1, x_2, \dots, x_{10} of 10 values, a student obtained the mean as 5.5 and

$$\sum_{i=1}^{10} x_i^2 = 371. \text{ He later found that he had noted two values in the data incorrectly as 4 and 5,}$$

instead of the correct values 6 and 8, respectively. The variance of the corrected data is

Options

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

Question Type : MCQ

Question ID : 7364751057

Option 1 ID : 7364753596

Option 2 ID : 7364753595

Option 3 ID : 7364753598

Option 4 ID : 7364753597

Status : Answered

Chosen Option : 4

- Q.12** Let circle C be the image of $x^2 + y^2 - 2x + 4y - 4 = 0$ in the line $2x - 3y + 5 = 0$ and A be the point on C such that OA is parallel to x-axis and A lies on the right hand side of the centre O of C. If $B(\alpha, \beta)$, with $\beta < 4$, lies on C such that the length of the arc AB is $(1/6)^{\text{th}}$ of the perimeter of C, then $\beta - \sqrt{3}\alpha$ is equal to

Options 1. $3 + \sqrt{3}$

2. $4 - \sqrt{3}$

3. 4

4. 3

Question Type : MCQ

Question ID : 7364751060

Option 1 ID : 7364753607

Option 2 ID : 7364753608

Option 3 ID : 7364753610

Option 4 ID : 7364753609

Status : Not Answered

Chosen Option : --

- Q.13** If $I(m, n) = \int_0^1 x^{m-1} (1-x)^{n-1} dx$, $m, n > 0$, then $I(9, 14) + I(10, 13)$ is

Options 1. $I(9, 13)$

2. $I(9, 1)$

3. $I(1, 13)$

4. $I(19, 27)$

Question Type : MCQ

Question ID : 7364751068

Option 1 ID : 7364753641

Option 2 ID : 7364753639

Option 3 ID : 7364753640

Option 4 ID : 7364753642

Status : Not Attempted and
Marked For Review

Chosen Option : --

- Q.14** For some $n \neq 10$, let the coefficients of the 5th, 6th and 7th terms in the binomial expansion of $(1+x)^{n+4}$ be in A.P. Then the largest coefficient in the expansion of $(1+x)^{n+4}$ is:

Options 1. 35

2. 70

3. 20

4. 10

Question Type : MCQ

Question ID : 7364751056

Option 1 ID : 7364753591

Option 2 ID : 7364753592

Option 3 ID : 7364753594

Option 4 ID : 7364753593

Status : Not Answered

Chosen Option : --

Q.15 Let $f(x) = \frac{2^{x+2} + 16}{2^{2x+1} + 2^{x+4} + 32}$. Then the value of $8\left(f\left(\frac{1}{15}\right) + f\left(\frac{2}{15}\right) + \dots + f\left(\frac{59}{15}\right)\right)$ is equal to

Options 1. 92

- 2. 102
- 3. 108
- 4. 118

Question Type : MCQ
 Question ID : 7364751051
 Option 1 ID : 7364753574
 Option 2 ID : 7364753573
 Option 3 ID : 7364753572
 Option 4 ID : 7364753571
 Status : Not Answered
 Chosen Option : --

Q.16 The product of all the rational roots of the equation $(x^2 - 9x + 11)^2 - (x-4)(x-5) = 3$, is equal to

Options 1. 21

- 2. 7
- 3. 14
- 4. 28

Question Type : MCQ
 Question ID : 7364751052
 Option 1 ID : 7364753577
 Option 2 ID : 7364753575
 Option 3 ID : 7364753576
 Option 4 ID : 7364753578
 Status : Not Answered
 Chosen Option : --

Q.17 If α and β are the roots of the equation $2z^2 - 3z - 2i = 0$, where $i = \sqrt{-1}$, then

$16 \cdot \operatorname{Re}\left(\frac{\alpha^{19} + \beta^{19} + \alpha^{11} + \beta^{11}}{\alpha^{15} + \beta^{15}}\right) \cdot \operatorname{Im}\left(\frac{\alpha^{19} + \beta^{19} + \alpha^{11} + \beta^{11}}{\alpha^{15} + \beta^{15}}\right)$ is equal to

Options 1. 409

- 2. 312
- 3. 441
- 4. 398

Question Type : MCQ
 Question ID : 7364751053
 Option 1 ID : 7364753581
 Option 2 ID : 7364753579
 Option 3 ID : 7364753582
 Option 4 ID : 7364753580
 Status : Not Answered
 Chosen Option : --

Q.18 Let $S_n = \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \dots$ upto n terms. If the sum of the first six terms of an A.P. with first term $-p$ and common difference p is $\sqrt{2026 S_{2025}}$, then the absolute difference between 20th and 15th terms of the A.P. is

- Options 1. 25
2. 90
3. 45
4. 20

Question Type : MCQ
 Question ID : 7364751055
 Option 1 ID : 7364753588
 Option 2 ID : 7364753590
 Option 3 ID : 7364753589
 Option 4 ID : 7364753587
 Status : Not Answered
 Chosen Option : --

Q.19 $\lim_{x \rightarrow 0} \operatorname{cosec} x \left(\sqrt{2\cos^2 x + 3\cos x} - \sqrt{\cos^2 x + \sin x + 4} \right)$ is:

- Options 1. $\frac{1}{2\sqrt{5}}$
 2. $-\frac{1}{2\sqrt{5}}$
 3. 0
 4. $\frac{1}{\sqrt{15}}$

Question Type : MCQ
 Question ID : 7364751062
 Option 1 ID : 7364753616
 Option 2 ID : 7364753617
 Option 3 ID : 7364753615
 Option 4 ID : 7364753618
 Status : Not Answered
 Chosen Option : --

Q.20 Let $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = 3\hat{i} + \hat{j} - \hat{k}$ and \vec{c} be three vectors such that \vec{c} is coplanar with \vec{a} and \vec{b} . If the vector \vec{c} is perpendicular to \vec{b} and $\vec{a} \cdot \vec{c} = 5$, then $|\vec{c}|$ is equal to

Options

1. $\sqrt{\frac{11}{6}}$
2. 18
3. 16
4. $\frac{1}{3\sqrt{2}}$

Question Type : MCQ

Question ID : 7364751063

Option 1 ID : 7364753619

Option 2 ID : 7364753621

Option 3 ID : 7364753622

Option 4 ID : 7364753620

Status : Not Answered

Chosen Option : --

Section : Mathematics Section B

Q.21

Let A be a 3×3 matrix such that $X^TAX = O$ for all nonzero 3×1 matrices $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$. If

$A \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix} = \begin{bmatrix} 1 \\ 4 \\ -5 \end{bmatrix}$, $A \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 4 \\ -8 \end{bmatrix}$, and $\det(\text{adj}(2(A + I))) = 2^\alpha 3^\beta 5^\gamma$, $\alpha, \beta, \gamma \in \mathbb{N}$, then $\alpha^2 + \beta^2 + \gamma^2$ is _____.

Give --

n
Ans
wer :

Question Type : SA

Question ID : 7364751072

Status : Not Answered

Q.22 Let $S = \{p_1, p_2, \dots, p_{10}\}$ be the set of first ten prime numbers. Let $A = S \cup P$, where P is the set of all possible products of distinct elements of S . Then the number of all ordered pairs (x, y) , $x \in S$, $y \in A$, such that x divides y , is _____.

Give --

n
Ans
wer :

Question Type : SA

Question ID : 7364751071

Status : Not Answered

Q.23

Let f be a differentiable function such that $2(x+2)^2 f(x) - 3(x+2)^2 = 10 \int_0^x (t+2) f(t) dt$, $x \geq 0$.

Then $f(2)$ is equal to _____.

Give --

n

Ans
wer :Question Type : **SA**Question ID : **7364751075**Status : **Not Answered****Q.24**

If for some α, β ; $\alpha \leq \beta$, $\alpha + \beta = 8$ and $\sec^2(\tan^{-1} \alpha) + \operatorname{cosec}^2(\cot^{-1} \beta) = 36$, then $\alpha^2 + \beta$ is _____.

Give **14**

n

Ans
wer :Question Type : **SA**Question ID : **7364751074**Status : **Answered****Q.25**

The number of 3-digit numbers, that are divisible by 2 and 3, but not divisible by 4 and 9, is _____.

Give --

n

Ans
wer :Question Type : **SA**Question ID : **7364751073**Status : **Not Answered**

Section : Physics Section A

Q.26

For an experimental expression $y = \frac{32.3 \times 1125}{27.4}$, where all the digits are significant. Then to report the value of y we should write

Options

1. $y = 1330$
2. $y = 1326.2$
3. $y = 1326.19$
4. $y = 1326.186$

Question Type : **MCQ**Question ID : **7364751076**Option 1 ID : **7364753659**Option 2 ID : **7364753658**Option 3 ID : **7364753657**Option 4 ID : **7364753656**Status : **Answered**Chosen Option : **1**

Q.27 An electron of mass 'm' with an initial velocity $\vec{v} = v_0 \hat{i}$ ($v_0 > 0$) enters an electric field

$\vec{E} = -E_0 \hat{k}$. If the initial de Broglie wavelength is λ_0 , the value after time t would be

Options 1. λ_0

$$2. \sqrt{\frac{\lambda_0}{1 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}}$$

$$3. \lambda_0 \sqrt{1 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}$$

$$4. \sqrt{\frac{\lambda_0}{1 + \frac{e^2 E_0^2 t^2}{m^2 v_0^2}}}$$

Question Type : MCQ

Question ID : 7364751093

Option 1 ID : 7364753724

Option 2 ID : 7364753726

Option 3 ID : 7364753725

Option 4 ID : 7364753727

Status : Answered

Chosen Option : 4

Q.28 Consider a parallel plate capacitor of area A (of each plate) and separation 'd' between the plates.

If E is the electric field and ϵ_0 is the permittivity of free space between the plates, then potential energy stored in the capacitor is

Options

$$1. \frac{1}{4} \epsilon_0 E^2 Ad$$

$$2. \frac{3}{4} \epsilon_0 E^2 Ad$$

$$3. \epsilon_0 E^2 Ad$$

$$4. \frac{1}{2} \epsilon_0 E^2 Ad$$

Question Type : MCQ

Question ID : 7364751088

Option 1 ID : 7364753704

Option 2 ID : 7364753707

Option 3 ID : 7364753706

Option 4 ID : 7364753705

Status : Answered

Chosen Option : 4

Q.29 A parallel plate capacitor was made with two rectangular plates, each with a length of $l = 3 \text{ cm}$ and breadth of $b = 1 \text{ cm}$. The distance between the plates is $3 \mu\text{m}$. Out of the following, which are the ways to increase the capacitance by a factor of 10?

- A. $l = 30 \text{ cm}$, $b = 1 \text{ cm}$, $d = 1 \mu\text{m}$
- B. $l = 3 \text{ cm}$, $b = 1 \text{ cm}$, $d = 30 \mu\text{m}$
- C. $l = 6 \text{ cm}$, $b = 5 \text{ cm}$, $d = 3 \mu\text{m}$
- D. $l = 1 \text{ cm}$, $b = 1 \text{ cm}$, $d = 10 \mu\text{m}$
- E. $l = 5 \text{ cm}$, $b = 2 \text{ cm}$, $d = 1 \mu\text{m}$

Choose the correct answer from the options given below:

Options 1. C only

- 2. C and E only
- 3. B and D only
- 4. A only

Question Type : MCQ
Question ID : 7364751087
Option 1 ID : 7364753703
Option 2 ID : 7364753702
Option 3 ID : 7364753701
Option 4 ID : 7364753700
Status : Answered
Chosen Option : 2

Q.30 The Young's double slit interference experiment is performed using light consisting of 480 nm and 600 nm wavelengths to form interference patterns. The least number of the bright fringes of 480 nm light that are required for the first coincidence with the bright fringes formed by 600 nm light is

Options 1. 4

- 2. 5
- 3. 8
- 4. 6

Question Type : MCQ
Question ID : 7364751089
Option 1 ID : 7364753708
Option 2 ID : 7364753709
Option 3 ID : 7364753711
Option 4 ID : 7364753710
Status : Answered
Chosen Option : 2

Q.31 The amount of work done to break a big water drop of radius 'R' into 27 small drops of equal radius is 10 J. The work done required to break the same big drop into 64 small drops of equal radius will be

- Options**
- 1. 15 J
 - 2. 20 J
 - 3. 5 J
 - 4. 10 J

Question Type : MCQ
Question ID : 7364751082
Option 1 ID : 7364753682
Option 2 ID : 7364753683
Option 3 ID : 7364753680
Option 4 ID : 7364753681
Status : Answered
Chosen Option : 1

Q.32 A satellite is launched into a circular orbit of radius 'R' around the earth. A second satellite is launched into an orbit of radius 1.03 R. The time period of revolution of the second satellite is larger than the first one approximately by

- Options**
- 1. 9%
 - 2. 4.5%
 - 3. 3%
 - 4. 2.5%

Question Type : MCQ
Question ID : 7364751081
Option 1 ID : 7364753677
Option 2 ID : 7364753679
Option 3 ID : 7364753678
Option 4 ID : 7364753676
Status : Answered
Chosen Option : 2

Q.33 An object of mass 'm' is projected from origin in a vertical xy plane at an angle 45° with the x-axis with an initial velocity v_0 . The magnitude and direction of the angular momentum of the object with respect to origin, when it reaches at the maximum height, will be [g is acceleration due to gravity]

Options

1. $\frac{mv_0^3}{2\sqrt{2}g}$ along positive z-axis
2. $\frac{mv_0^3}{4\sqrt{2}g}$ along negative z-axis
3. $\frac{mv_0^3}{4\sqrt{2}g}$ along positive z-axis
4. $\frac{mv_0^3}{2\sqrt{2}g}$ along negative z-axis

Question Type : MCQ

Question ID : 7364751077

Option 1 ID : 7364753661

Option 2 ID : 7364753662

Option 3 ID : 7364753660

Option 4 ID : 7364753663

Status : Answered

Chosen Option : 2

Q.34 An alternating current is given by $I = I_A \sin\omega t + I_B \cos\omega t$. The r.m.s current will be

Options

1. $\sqrt{\frac{I_A^2 + I_B^2}{2}}$
2. $\sqrt{I_A^2 + I_B^2}$
3. $\frac{|I_A + I_B|}{\sqrt{2}}$
4. $\frac{\sqrt{I_A^2 + I_B^2}}{2}$

Question Type : MCQ

Question ID : 7364751086

Option 1 ID : 7364753697

Option 2 ID : 7364753699

Option 3 ID : 7364753698

Option 4 ID : 7364753696

Status : Answered

Chosen Option : 1

Q.35 A plano-convex lens having radius of curvature of first surface 2 cm exhibits focal length of f_1 in air. Another plano-convex lens with first surface radius of curvature 3 cm has focal length of f_2 when it is immersed in a liquid of refractive index 1.2. If both the lenses are made of same glass of refractive index 1.5, the ratio of f_1 and f_2 will be

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

Question Type : MCQ
Question ID : 7364751092
Option 1 ID : 7364753720
Option 2 ID : 7364753721
Option 3 ID : 7364753723
Option 4 ID : 7364753722
Status : Answered
Chosen Option : 3

Q.36 A particle is executing simple harmonic motion with time period 2 s and amplitude 1 cm. If D and d are the total distance and displacement covered by the particle in 12.5 s, then $\frac{D}{d}$ is

- Options 1. $\frac{16}{5}$
2. 10
3. 25
4. $\frac{15}{4}$

Question Type : MCQ
Question ID : 7364751085
Option 1 ID : 7364753694
Option 2 ID : 7364753695
Option 3 ID : 7364753693
Option 4 ID : 7364753692
Status : Not Attempted and
Marked For Review
Chosen Option : --

Q.37 An ideal gas goes from an initial state to final state. During the process, the pressure of gas increases linearly with temperature.

- A. The work done by gas during the process is zero.
- B. The heat added to gas is different from change in its internal energy.
- C. The volume of the gas is increased.
- D. The internal energy of the gas is increased.
- E. The process is isochoric (constant volume process)

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

Options 1. E Only

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

Question Type : MCQ

Question ID : 7364751084

Option 1 ID : 7364753691

Option 2 ID : 7364753689

Option 3 ID : 7364753688

Option 4 ID : 7364753690

Status : Answered

Chosen Option : 4

Q.38 An air bubble of radius 0.1 cm lies at a depth of 20 cm below the free surface of a liquid of density 1000 kg/m^3 . If the pressure inside the bubble is 2100 N/m^2 greater than the atmospheric pressure, then the surface tension of the liquid in SI unit is (use $g = 10 \text{ m/s}^2$)

Options 1. 0.02
2. 0.25
3. 0.1
4. 0.05

Question Type : MCQ

Question ID : 7364751083

Option 1 ID : 7364753687

Option 2 ID : 7364753686

Option 3 ID : 7364753685

Option 4 ID : 7364753684

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.39 A thin plano convex lens made of glass of refractive index 1.5 is immersed in a liquid of refractive index 1.2. When the plane side of the lens is silver coated for complete reflection, the lens immersed in the liquid behaves like a concave mirror of focal length 0.2 m. The radius of curvature of the curved surface of the lens is

- Options**
- 1. 0.20 m
 - 2. 0.15 m
 - 3. 0.25 m
 - 4. 0.10 m

Question Type : **MCQ**

Question ID : **7364751090**

Option 1 ID : **7364753714**

Option 2 ID : **7364753713**

Option 3 ID : **7364753715**

Option 4 ID : **7364753712**

Status : **Not Answered**

Chosen Option : --

Q.40 During the transition of electron from state A to state C of a Bohr atom, the wavelength of emitted radiation is 2000 Å and it becomes 6000 Å when the electron jumps from state B to state C. Then the wavelength of the radiation emitted during the transition of electrons from state A to state B is

- Options**
- 1. 2000 Å
 - 2. 6000 Å
 - 3. 3000 Å
 - 4. 4000 Å

Question Type : **MCQ**

Question ID : **7364751094**

Option 1 ID : **7364753728**

Option 2 ID : **7364753731**

Option 3 ID : **7364753729**

Option 4 ID : **7364753730**

Status : **Answered**

Chosen Option : **3**

Q.41 Consider the following statements:

- A. The junction area of solar cell is made very narrow compared to a photo diode.
- B. Solar cells are not connected with any external bias.
- C. LED is made of lightly doped p-n junction.
- D. Increase of forward current results in continuous increase of LED light intensity.
- E. LEDs have to be connected in forward bias for emission of light.

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

Options 1. B, D, E Only

- 2. B, E Only
- 3. A, C Only
- 4. A, C, E Only

Question Type : MCQ
 Question ID : 7364751095
 Option 1 ID : 7364753734
 Option 2 ID : 7364753733
 Option 3 ID : 7364753732
 Option 4 ID : 7364753735
 Status : Answered
 Chosen Option : 4

Q.42 A uniform solid cylinder of mass 'm' and radius 'r' rolls along an inclined rough plane of inclination 45° . If it starts to roll from rest from the top of the plane then the linear acceleration of the cylinder's axis will be

Options

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

Question Type : MCQ
 Question ID : 7364751080
 Option 1 ID : 7364753675
 Option 2 ID : 7364753674
 Option 3 ID : 7364753672
 Option 4 ID : 7364753673
 Status : Answered
 Chosen Option : 1

Q.43 A car of mass 'm' moves on a banked road having radius 'r' and banking angle θ . To avoid slipping from banked road, the maximum permissible speed of the car is v_0 . The coefficient of friction μ between the wheels of the car and the banked road is

Options

1. $\mu = \frac{v_0^2 + rg \tan \theta}{rg - v_0^2 \tan \theta}$
2. $\mu = \frac{v_0^2 + rg \tan \theta}{rg + v_0^2 \tan \theta}$
3. $\mu = \frac{v_0^2 - rg \tan \theta}{rg - v_0^2 \tan \theta}$
4. $\mu = \frac{v_0^2 - rg \tan \theta}{rg + v_0^2 \tan \theta}$

Question Type : MCQ

Question ID : 7364751078

Option 1 ID : 7364753665

Option 2 ID : 7364753664

Option 3 ID : 7364753667

Option 4 ID : 7364753666

Status : Not Answered

Chosen Option : --

Q.44 What is the relative decrease in focal length of a lens for an increase in optical power by 0.1D from 2.5D ? [‘D’ stands for dioptre]

Options

1. 0.04
2. 0.40
3. 0.1
4. 0.01

Question Type : MCQ

Question ID : 7364751091

Option 1 ID : 7364753718

Option 2 ID : 7364753719

Option 3 ID : 7364753717

Option 4 ID : 7364753716

Status : Answered

Chosen Option : 4

Q.45 A force $F = \alpha + \beta x^2$ acts on an object in the x-direction. The work done by the force is 5 J when the object is displaced by 1 m. If the constant $\alpha = 1\text{N}$ then β will be

Options

1. 10 N/m^2
2. 12 N/m^2
3. 8 N/m^2
4. 15 N/m^2

Question Type : MCQ

Question ID : 7364751079

Option 1 ID : 7364753668

Option 2 ID : 7364753669

Option 3 ID : 7364753671

Option 4 ID : 7364753670

Status : Answered

Chosen Option : 2

Section : Physics Section B

Q.46 The temperature of 1 mole of an ideal monoatomic gas is increased by 50°C at constant pressure.

The total heat added and change in internal energy are E_1 and E_2 , respectively. If $\frac{E_1}{E_2} = \frac{x}{9}$ then
the value of x is _____

Give 15

n

Ans
wer :

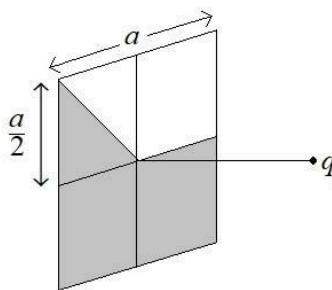
Question Type : SA

Question ID : 7364751097

Status : Answered

Q.47 A square loop of sides $a = 1\text{ m}$ is held normally in front of a point charge $q = 1\text{ C}$. The flux of the

electric field through the shaded region is $\frac{5}{p} \times \frac{1}{\epsilon_0} \frac{\text{Nm}^2}{\text{C}}$, where the value of p is _____.



Give --

n

Ans
wer :

Question Type : SA

Question ID : 7364751100

Status : Not Answered

Q.48

A current of 5A exists in a square loop of side $\frac{1}{\sqrt{2}}\text{ m}$. Then the magnitude of the magnetic field

B at the centre of the square loop will be $p \times 10^{-6}\text{ T}$. where, value of p is _____.

[Take $\mu_0 = 4\pi \times 10^{-7}\text{ T m A}^{-1}$].

Give 8

n

Ans
wer :

Question Type : SA

Question ID : 7364751099

Status : Answered

Q.49 The least count of a screw guage is 0.01 mm . If the pitch is increased by 75% and number of

divisions on the circular scale is reduced by 50% , the new least count will be _____ $\times 10^{-3}\text{ mm}$

Give 12

n

Ans
wer :

Question Type : SA

Question ID : 7364751096

Status : Answered

Q.50 A wire of resistance $9\ \Omega$ is bent to form an equilateral triangle. Then the equivalent resistance across any two vertices will be _____ ohm.

Give 2
n
Ans
wer :

Question Type : **SA**
Question ID : **7364751098**
Status : **Answered**

Section : Chemistry Section A

Q.51 Which of the following statements are NOT true about the periodic table?

- A. The properties of elements are function of atomic weights.
- B. The properties of elements are function of atomic numbers.
- C. Elements having similar outer electronic configurations are arranged in same period.
- D. An element's location reflects the quantum numbers of the last filled orbital.
- E. The number of elements in a period is same as the number of atomic orbitals available in energy level that is being filled.

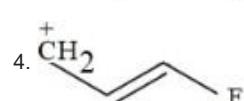
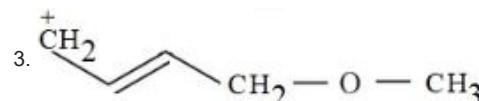
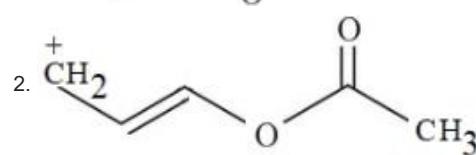
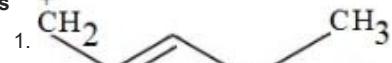
Choose the correct answer from the options given below:

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

Question Type : **MCQ**
Question ID : **7364751108**
Option 1 ID : **7364753771**
Option 2 ID : **7364753770**
Option 3 ID : **7364753772**
Option 4 ID : **7364753769**
Status : **Answered**
Chosen Option : **4**

Q.52 Which one of the carbocations from the following is most stable?

Options



Question Type : MCQ

Question ID : 7364751114

Option 1 ID : 7364753794

Option 2 ID : 7364753793

Option 3 ID : 7364753795

Option 4 ID : 7364753796

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.53

For a reaction, $\text{N}_2\text{O}_5(\text{g}) \rightarrow 2\text{NO}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g})$ in a constant volume container, no products were present initially. The final pressure of the system when 50% of reaction gets completed is

Options 1. 7/4 times of initial pressure

2. 7/2 times of initial pressure

3. 5 times of initial pressure

4. 5/2 times of initial pressure

Question Type : MCQ

Question ID : 7364751107

Option 1 ID : 7364753765

Option 2 ID : 7364753767

Option 3 ID : 7364753768

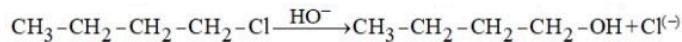
Option 4 ID : 7364753766

Status : Answered

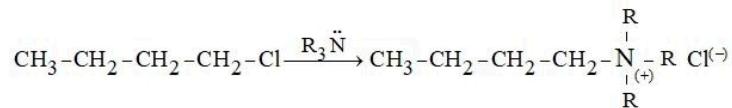
Chosen Option : 1

Q.54 Given below are two statements:

Statement I: The conversion proceeds well in the less polar medium .



Statement II: The conversion proceeds well in the more polar medium .



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

Options 1. Statement I is false but Statement II is true

2. Both Statement I and Statement II are false

3. Statement I is true but Statement II is false

4. Both Statement I and Statement II are true

Question Type : MCQ

Question ID : 7364751116

Option 1 ID : 7364753804

Option 2 ID : 7364753802

Option 3 ID : 7364753803

Option 4 ID : 7364753801

Status : Not Answered

Chosen Option : --

Q.55 The carbohydrate “Ribose” present in DNA, is

A. A pentose sugar

B. present in pyranose form

C. in “D” configuration

D. a reducing sugar, when free

E. in α -anomeric form

Choose the correct answer from the options given below:

Options 1. A, C and D Only

2. A, D and E Only

3. A, B and E Only

4. B, D and E Only

Question Type : MCQ

Question ID : 7364751120

Option 1 ID : 7364753817

Option 2 ID : 7364753820

Option 3 ID : 7364753818

Option 4 ID : 7364753819

Status : Answered

Chosen Option : 1

Q.56 Which of the following linear combination of atomic orbitals will lead to formation of molecular orbitals in homonuclear diatomic molecules [internuclear axis in z- direction] ?

- A. $2p_z$ and $2p_x$
- B. $2s$ and $2p_x$
- C. $3d_{xy}$ and $3d_{x^2-y^2}$
- D. $2s$ and $2p_z$
- E. $2p_z$ and $3d_{x^2-y^2}$

Choose the correct answer from the options given below:

Options 1. E Only

- 2. D Only
- 3. C and D Only
- 4. A and B Only

Question Type : MCQ
Question ID : 7364751101
Option 1 ID : 7364753744
Option 2 ID : 7364753743
Option 3 ID : 7364753742
Option 4 ID : 7364753741
Status : Answered
Chosen Option : 2

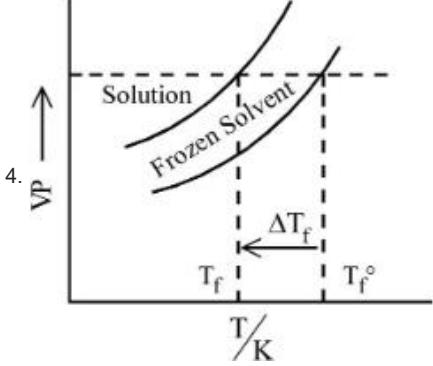
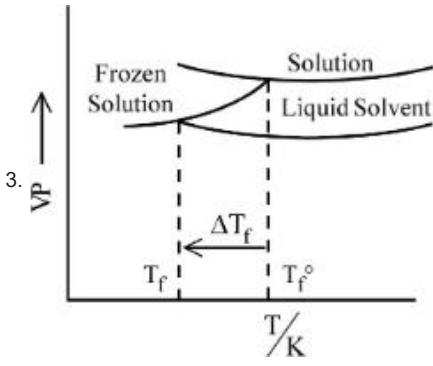
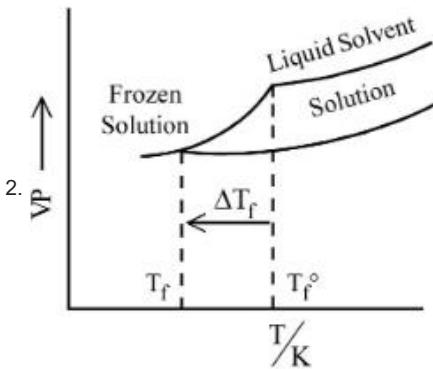
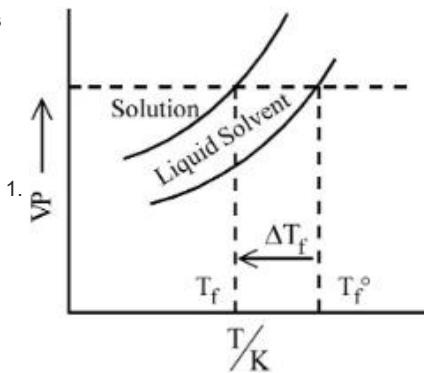
Q.57 Let us consider an endothermic reaction which is non-spontaneous at the freezing point of water. However, the reaction is spontaneous at boiling point of water. Choose the correct option.

Options 1. ΔH is (+ve) but ΔS is (-ve)
2. ΔH is (-ve) but ΔS is (+ve)
3. Both ΔH and ΔS are (+ve)
4. Both ΔH and ΔS are (-ve)

Question Type : MCQ
Question ID : 7364751103
Option 1 ID : 7364753752
Option 2 ID : 7364753749
Option 3 ID : 7364753750
Option 4 ID : 7364753751
Status : Not Answered
Chosen Option : --

Q.58 Consider the given plots of vapour pressure (VP) vs temperature(T/K). Which amongst the following options is correct graphical representation showing ΔT_f , depression in the freezing point of a solvent in a solution?

Options



Question Type : MCQ

Question ID : 7364751104

Option 1 ID : 7364753754

Option 2 ID : 7364753756

Option 3 ID : 7364753753

Option 4 ID : 7364753755

Status : Not Answered

Chosen Option : --

Q.59 Which of the following statement is true with respect to H_2O , NH_3 and CH_4 ?

- A. The central atoms of all the molecules are sp^3 hybridized.
- B. The $\text{H}-\text{O}-\text{H}$, $\text{H}-\text{N}-\text{H}$ and $\text{H}-\text{C}-\text{H}$ angles in the above molecules are 104.5° , 107.5° and 109.5° , respectively.
- C. The increasing order of dipole moment is $\text{CH}_4 < \text{NH}_3 < \text{H}_2\text{O}$.
- D. Both H_2O and NH_3 are Lewis acids and CH_4 is a Lewis base.
- E. A solution of NH_3 in H_2O is basic. In this solution NH_3 and H_2O act as Lowry-Bronsted acid and base respectively.

Choose the correct answer from the options given below:

Options 1. A, D and E Only

2. C, D and E Only

3. A, B, C and E Only

4. A, B and C Only

Question Type : MCQ

Question ID : 7364751102

Option 1 ID : 7364753748

Option 2 ID : 7364753746

Option 3 ID : 7364753747

Option 4 ID : 7364753745

Status : Answered

Chosen Option : 4

Q.60 Given below are two statements I and II.

Statement I: Dumas method is used for estimation of "Nitrogen" in an organic compound.

Statement II: Dumas method involves the formation of ammonium sulphate by heating the organic compound with conc H_2SO_4 .

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. 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 : 7364751113

Option 1 ID : 7364753790

Option 2 ID : 7364753791

Option 3 ID : 7364753792

Option 4 ID : 7364753789

Status : Answered

Chosen Option : 4

Q.61 The large difference between the melting and boiling points of oxygen and sulphur may be explained on the basis of

Options 1. Atomicity

2. Atomic size
3. Electron gain enthalpy
4. Electronegativity

Question Type : MCQ

Question ID : 7364751109

Option 1 ID : 7364753775

Option 2 ID : 7364753773

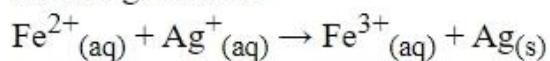
Option 3 ID : 7364753776

Option 4 ID : 7364753774

Status : Answered

Chosen Option : 2

Q.62 For the given cell



The standard cell potential of the above reaction is

Given:



Options 1. $y - 2x$

2. $x + 2y$

3. $x + y - z$

4. $x + 2y - 3z$

Question Type : MCQ

Question ID : 7364751106

Option 1 ID : 7364753764

Option 2 ID : 7364753761

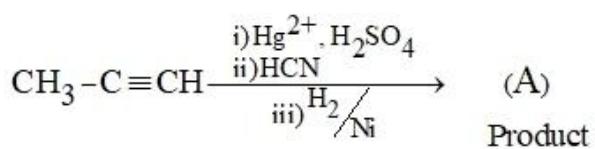
Option 3 ID : 7364753762

Option 4 ID : 7364753763

Status : Answered

Chosen Option : 3

Q.63 The product (A) formed in the following reaction sequence is



Options

1. $\text{CH}_3-\text{CH}_2-\overset{\text{NH}_2}{\underset{|}{\text{CH}}}-\text{CH}_2-\text{OH}$
2. $\text{CH}_3-\overset{\text{OH}}{\underset{|}{\text{C}}}-\text{CH}_2-\text{NH}_2$
3. $\text{CH}_3-\overset{\text{NH}_2}{\underset{|}{\text{C}}}-\text{CH}_2-\text{OH}$
4. $\text{CH}_3-\text{CH}_2-\overset{\text{OH}}{\underset{|}{\text{CH}}}-\text{CH}_2-\text{NH}_2$

Question Type : MCQ

Question ID : 7364751119

Option 1 ID : 7364753816

Option 2 ID : 7364753814

Option 3 ID : 7364753815

Option 4 ID : 7364753813

Status : Answered

Chosen Option : 2

Q.64 K_{sp} for Cr(OH)_3 is 1.6×10^{-30} . What is the molar solubility of this salt in water?

- Options
1. $\sqrt[2]{1.6 \times 10^{-30}}$
 2. $\sqrt[5]{1.8 \times 10^{-30}}$
 3. $\sqrt[4]{\frac{1.6 \times 10^{-30}}{27}}$
 4. $\frac{1.8 \times 10^{-30}}{27}$

Question Type : MCQ

Question ID : 7364751105

Option 1 ID : 7364753757

Option 2 ID : 7364753758

Option 3 ID : 7364753759

Option 4 ID : 7364753760

Status : Answered

Chosen Option : 3

Q.65 One mole of the octahedral complex compound $\text{Co}(\text{NH}_3)_5 \text{Cl}_3$ gives 3 moles of ions on dissolution in water. One mole of the same complex reacts with excess of AgNO_3 solution to yield two moles of $\text{AgCl}_{(\text{s})}$. The structure of the complex is:

- Options**
- 1. $[\text{Co}(\text{NH}_3)_4 \text{Cl}_2] \cdot \text{Cl} \cdot \text{NH}_3$
 - 2. $[\text{Co}(\text{NH}_3)_3 \text{Cl}_3] \cdot 2\text{NH}_3$
 - 3. $[\text{Co}(\text{NH}_3)_5 \text{Cl}] \text{Cl}_2$
 - 4. $[\text{Co}(\text{NH}_3)_4 \text{Cl}] \cdot \text{Cl}_2 \cdot \text{NH}_3$

Question Type : MCQ

Question ID : 7364751112

Option 1 ID : 7364753786

Option 2 ID : 7364753785

Option 3 ID : 7364753788

Option 4 ID : 7364753787

Status : Answered

Chosen Option : 3

Q.66 Which of the following arrangements with respect to their reactivity in nucleophilic addition reaction is correct?

Options

- 1. benzaldehyde < acetophenone < p- nitrobenzaldehyde < p-tolualdehyde
- 2. acetophenone < p-tolualdehyde < benzaldehyde < p- nitrobenzaldehyde
- 3. acetophenone < benzaldehyde < p-tolualdehyde < p- nitrobenzaldehyde
- 4. p- nitrobenzaldehyde < benzaldehyde < p-tolualdehyde < acetophenone

Question Type : MCQ

Question ID : 7364751118

Option 1 ID : 7364753809

Option 2 ID : 7364753810

Option 3 ID : 7364753811

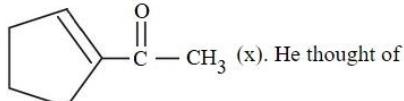
Option 4 ID : 7364753812

Status : Answered

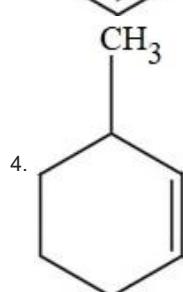
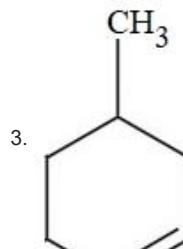
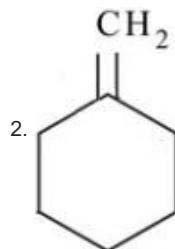
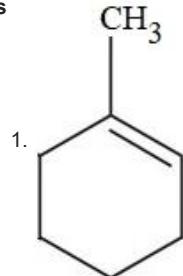
Chosen Option : 2

Q.67

Aman has been asked to synthesise the molecule



preparing the molecule using an aldol condensation reaction. He found a few cyclic alkenes in his laboratory. He thought of performing ozonolysis reaction on alkene to produce a dicarbonyl compound followed by aldol reaction to prepare "x". Predict the suitable alkene that can lead to the formation of "x".

Options

Question Type : MCQ

Question ID : 7364751117

Option 1 ID : 7364753805

Option 2 ID : 7364753808

Option 3 ID : 7364753807

Option 4 ID : 7364753806

Status : Answered

Chosen Option : 1

Q.68 Preparation of potassium permanganate from MnO_2 involves two step process in which the 1st step is a reaction with KOH and KNO_3 to produce

Options

1. $KMnO_4$
2. K_3MnO_4
3. K_2MnO_4
4. $K_4[Mn(OH)_6]$

Question Type : MCQ

Question ID : 7364751111

Option 1 ID : 7364753781

Option 2 ID : 7364753782

Option 3 ID : 7364753784

Option 4 ID : 7364753783

Status : Answered

Chosen Option : 3

Q.69 Which of the following ions is the strongest oxidizing agent?
(Atomic Number of Ce = 58, Eu = 63, Tb = 65, Lu = 71)

Options

1. Tb^{4+}
2. Ce^{3+}
3. Eu^{2+}
4. Lu^{3+}

Question Type : MCQ

Question ID : 7364751110

Option 1 ID : 7364753779

Option 2 ID : 7364753777

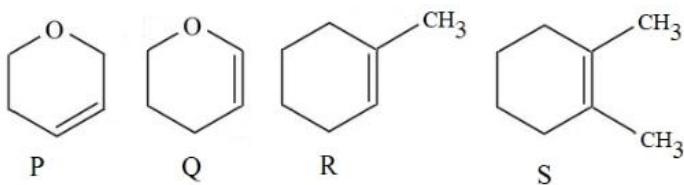
Option 3 ID : 7364753778

Option 4 ID : 7364753780

Status : Answered

Chosen Option : 3

Q.70 Following are the four molecules "P", "Q", "R" and "S".
Which one among the four molecules will react with $H-Br_{(aq)}$ at the fastest rate?



Options

1. R
2. S
3. Q
4. P

Question Type : MCQ

Question ID : 7364751115

Option 1 ID : 7364753799

Option 2 ID : 7364753800

Option 3 ID : 7364753798

Option 4 ID : 7364753797

Status : Not Answered

Chosen Option : --

Section : Chemistry Section B

Q.71 Xg of benzoic acid on reaction with aq NaHCO_3 released CO_2 that occupied 11.2 L volume at STP.

X is _____ g.

Give **61**

n

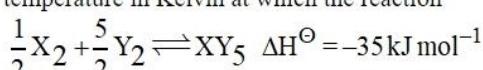
Ans
wer :

Question Type : **SA**

Question ID : **7364751124**

Status : **Answered**

Q.72 Standard entropies of X_2 , Y_2 and XY_5 are 70, 50 and $110 \text{ J K}^{-1} \text{ mol}^{-1}$ respectively. The temperature in Kelvin at which the reaction



will be at equilibrium is _____ (Nearest integer)

Give **7000**

n

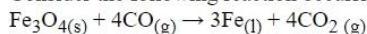
Ans
wer :

Question Type : **SA**

Question ID : **7364751122**

Status : **Answered**

Q.73 Consider the following reaction occurring in the blast furnace:



'x' kg of iron is produced when 2.32×10^3 kg Fe_3O_4 and 2.8×10^2 kg CO are brought together in the furnace. The value of 'x' is _____. (nearest integer)

{Given:

molar mass of $\text{Fe}_3\text{O}_4 = 232 \text{ g mol}^{-1}$

molar mass of CO = 28 g mol^{-1}

molar mass of Fe = 56 g mol^{-1} }

Give **420**

n

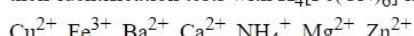
Ans
wer :

Question Type : **SA**

Question ID : **7364751121**

Status : **Answered**

Q.74 Among the following cations, the number of cations which will give characteristic precipitate in their identification tests with $\text{K}_4[\text{Fe}(\text{CN})_6]$ is _____.



Give --

n

Ans
wer :

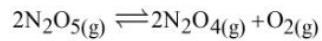
Question Type : **SA**

Question ID : **7364751125**

Status : **Not Answered**

Q.75 37.8 g N_2O_5 was taken in a 1 L reaction vessel and allowed to undergo the following reaction

at 500 K



The total pressure at equilibrium was found to be 18.65 bar.

Then, $K_p = \underline{\hspace{2cm}} \times 10^{-2}$ [nearest integer]

Assume N_2O_5 to behave ideally under these conditions.

Given: $R = 0.082 \text{ bar L mol}^{-1} \text{ K}^{-1}$

Give --

n

Ans

wer :

Question Type : **SA**

Question ID : **7364751123**

Status : **Not Answered**