

NTA JEE Mains Jan 2026

Application No	
Candidate Name	
Roll No.	
Test Date	24/01/2026
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 Let 729, 81, 9, 1, ... be a sequence and P_n denote the product of the first n terms of this sequence.

If $2 \sum_{n=1}^{40} (P_n)^{\frac{1}{n}} = \frac{3^\alpha - 1}{3^\beta}$ and $\gcd(\alpha, \beta) = 1$, then

$\alpha + \beta$ is equal to

Options 1. 73
 2. 75
 3. 76
 4. 74

Question Type : MCQ
 Question ID : 444792529
 Option 1 ID : 4447921798
 Option 2 ID : 4447921800
 Option 3 ID : 4447921801
 Option 4 ID : 4447921799
 Status : Not Answered
 Chosen Option : --

Q.2 The value of $\frac{\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ}{\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ}$ is equal to

Options 1. 32
 2. 64
 3. 12
 4. 16

Question Type : MCQ
 Question ID : 444792539
 Option 1 ID : 4447921840
 Option 2 ID : 4447921841
 Option 3 ID : 4447921839
 Option 4 ID : 4447921838
 Status : Answered
 Chosen Option : 2

Q.3 Let the lines $L_1 : \vec{r} = \hat{i} + 2\hat{j} + 3\hat{k} + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$, $\lambda \in \mathbb{R}$ and $L_2 : \vec{r} = (4\hat{i} + \hat{j}) + \mu(5\hat{i} + 2\hat{j} + \hat{k})$, $\mu \in \mathbb{R}$, intersect at the point R. Let P and Q be the points lying on lines L_1 and L_2 , respectively, such that $|\overline{PR}| = \sqrt{29}$ and $|\overline{PQ}| = \sqrt{\frac{47}{3}}$. If the point P lies in the first octant, then $27(QR)^2$ is equal to

Options 1. 340
2. 348
3. 360
4. 320

Question Type : MCQ
Question ID : 444792541
Option 1 ID : 4447921847
Option 2 ID : 4447921848
Option 3 ID : 4447921849
Option 4 ID : 4447921846
Status : Not Answered
Chosen Option : --

Q.4 The number of the real solutions of the equation:

$$x|x+3| + |x-1| - 2 = 0$$
 is

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

Question Type : MCQ
Question ID : 444792530
Option 1 ID : 4447921804
Option 2 ID : 4447921805
Option 3 ID : 4447921802
Option 4 ID : 4447921803
Status : Answered
Chosen Option : 3

Q.5 Let A_1 be the bounded area enclosed by the curves $y = x^2 + 2$, $x + y = 8$ and y -axis that lies in the first quadrant. Let A_2 be the bounded area enclosed by the curves $y = x^2 + 2$, $y^2 = x$, $x = 2$, and y -axis that lies in the first quadrant. Then $A_1 - A_2$ is equal to

Options

1. $\frac{2}{3}(4\sqrt{2} + 1)$
2. $\frac{2}{3}(3\sqrt{2} + 1)$
3. $\frac{2}{3}(2\sqrt{2} + 1)$
4. $\frac{2}{3}(\sqrt{2} + 1)$

Question Type : MCQ
Question ID : 444792545
Option 1 ID : 4447921865
Option 2 ID : 4447921864
Option 3 ID : 4447921863
Option 4 ID : 4447921862
Status : Not Answered
Chosen Option : --

Q.6 Let R be a relation defined on the set $\{1, 2, 3, 4\} \times \{1, 2, 3, 4\}$ by

$$R = \{((a, b), (c, d)) : 2a + 3b = 3c + 4d\}.$$

Then the number of elements in R is

Options 1. 18

2. 12
3. 6
4. 15

Question Type : MCQ
Question ID : 444792526
Option 1 ID : 4447921789
Option 2 ID : 4447921787
Option 3 ID : 4447921786
Option 4 ID : 4447921788
Status : Not Answered
Chosen Option : --

Q.7 Let $\vec{a} = 2\hat{i} + \hat{j} - 2\hat{k}$, $\vec{b} = \hat{i} + \hat{j}$ and $\vec{c} = \vec{a} \times \vec{b}$. Let \vec{d} be a vector such that $|\vec{d} - \vec{a}| = \sqrt{11}$, $|\vec{c} \times \vec{d}| = 3$ and the angle between \vec{c} and \vec{d} is $\frac{\pi}{4}$. Then $\vec{a} \cdot \vec{d}$ is equal to

Options 1. 1

2. 3
3. 11
4. 0

Question Type : MCQ
 Question ID : 444792540
 Option 1 ID : 4447921843
 Option 2 ID : 4447921844
 Option 3 ID : 4447921845
 Option 4 ID : 4447921842
 Status : Answered
 Chosen Option : 4

Q.8 Let each of the two ellipses $E_1 : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, (a > b)$ and

$E_2 : \frac{x^2}{A^2} + \frac{y^2}{B^2} = 1, (A < B)$ have eccentricity $\frac{4}{5}$. Let the lengths of the latus

recta of E_1 and E_2 be l_1 and l_2 , respectively, such that $2l_1^2 = 9l_2^2$. If the distance between the foci of E_1 is 8, then the distance between the foci of E_2 is

Options 1. $\frac{16}{5}$
 2. $\frac{96}{5}$
 3. $\frac{8}{5}$
 4. $\frac{32}{5}$

Question Type : MCQ
 Question ID : 444792535
 Option 1 ID : 4447921823
 Option 2 ID : 4447921825
 Option 3 ID : 4447921822
 Option 4 ID : 4447921824
 Status : Answered
 Chosen Option : 4

Q.9

Let $S = \left\{ z \in \mathbb{C} : \left| \frac{z-6i}{z-2i} \right| = 1 \text{ and } \left| \frac{z-8+2i}{z+2i} \right| = \frac{3}{5} \right\}$.

Then $\sum_{z \in S} |z|^2$ is equal to

Options 1. 398

2. 385

3. 423

4. 413

Question Type : MCQ

Question ID : 444792528

Option 1 ID : 4447921795

Option 2 ID : 4447921794

Option 3 ID : 4447921797

Option 4 ID : 4447921796

Status : Not Answered

Chosen Option : --

Q.10

Let $f(t) = \int \left(\frac{1 - \sin(\log_e t)}{1 - \cos(\log_e t)} \right) dt, t > 1$.

If $f(e^{\pi/2}) = -e^{\pi/2}$ and $f(e^{\pi/4}) = \alpha e^{\pi/4}$, then α equals

Options 1. $-1 + \sqrt{2}$

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

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

4. $1 + \sqrt{2}$

Question Type : MCQ

Question ID : 444792544

Option 1 ID : 4447921861

Option 2 ID : 4447921858

Option 3 ID : 4447921859

Option 4 ID : 4447921860

Status : Not Answered

Chosen Option : --

Q.11

Let $S = \frac{1}{25!} + \frac{1}{3!23!} + \frac{1}{5!21!} + \dots$ up to 13 terms. If $13S = \frac{2^k}{n!}$, $k \in \mathbb{N}$, then

$n + k$ is equal to

Options 1. 52

2. 51

3. 49

4. 50

Question Type : MCQ
Question ID : 444792532
Option 1 ID : 4447921813
Option 2 ID : 4447921812
Option 3 ID : 4447921810
Option 4 ID : 4447921811
Status : Not Answered
Chosen Option : --

Q.12

Let $\alpha, \beta \in \mathbb{R}$ be such that the function $f(x) = \begin{cases} 2\alpha(x^2 - 2) + 2\beta x & , x < 1 \\ (\alpha + 3)x + (\alpha - \beta) & , x \geq 1 \end{cases}$

be differentiable at all $x \in \mathbb{R}$. Then $34(\alpha + \beta)$ is equal to

Options 1. 48

2. 84

3. 24

4. 36

Question Type : MCQ
Question ID : 444792543
Option 1 ID : 4447921856
Option 2 ID : 4447921857
Option 3 ID : 4447921854
Option 4 ID : 4447921855
Status : Not Answered
Chosen Option : --

Q.13 The mean and variance of a data of 10 observations are 10 and 2, respectively. If an observations α in this data is replaced by β , then the mean and variance become 10.1 and 1.99, respectively. Then $\alpha + \beta$ equals

Options 1. 10

2. 15

3. 20

4. 5

Question Type : MCQ
Question ID : 444792533
Option 1 ID : 4447921815
Option 2 ID : 4447921816
Option 3 ID : 4447921817
Option 4 ID : 4447921814
Status : Not Answered
Chosen Option : --

Q.14

If the function $f(x) = \frac{e^x(e^{\tan x-x}-1) + \log_e(\sec x + \tan x) - x}{\tan x - x}$ is

continuous at $x = 0$, then the value of $f(0)$ is equal to

Options

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

Question Type : MCQ
Question ID : 444792542
Option 1 ID : 4447921851
Option 2 ID : 4447921852
Option 3 ID : 4447921853
Option 4 ID : 4447921850
Status : Answered
Chosen Option : 4

Q.15 From a lot containing 10 defective and 90 non-defective bulbs, 8 bulbs are selected one by one with replacement. Then the probability of getting at least 7 defective bulbs is

Options

1. $\frac{67}{10^8}$
2. $\frac{73}{10^8}$
3. $\frac{7}{10^7}$
4. $\frac{81}{10^8}$

Question Type : MCQ
Question ID : 444792534
Option 1 ID : 4447921821
Option 2 ID : 4447921818
Option 3 ID : 4447921819
Option 4 ID : 4447921820
Status : Not Answered
Chosen Option : --

Q.16 Consider an A.P.: a_1, a_2, \dots, a_n ; $a_1 > 0$. If $a_2 - a_1 = \frac{-3}{4}$, $a_n = \frac{1}{4}a_1$, and

$$\sum_{i=1}^n a_i = \frac{525}{2}, \text{ then } \sum_{i=1}^{17} a_i \text{ is equal to}$$

Options 1. 136

2. 476

3. 238

4. 952

Question Type : MCQ

Question ID : 444792531

Option 1 ID : 4447921806

Option 2 ID : 4447921808

Option 3 ID : 4447921807

Option 4 ID : 4447921809

Status : Not Answered

Chosen Option : --

Q.17 Let a circle of radius 4 pass through the origin O, the points $A(-\sqrt{3}a, 0)$ and $B(0, -\sqrt{2}b)$, where a and b are real parameters and $ab \neq 0$. Then the locus of the centroid of $\triangle OAB$ is a circle of radius

Options 1. $\frac{8}{3}$

2. $\frac{5}{3}$

3. $\frac{11}{3}$

4. $\frac{7}{3}$

Question Type : MCQ

Question ID : 444792536

Option 1 ID : 4447921828

Option 2 ID : 4447921826

Option 3 ID : 4447921829

Option 4 ID : 4447921827

Status : Answered

Chosen Option : 1

Q.18

Let A(1, 0), B(2, -1) and C $\left(\frac{7}{3}, \frac{4}{3}\right)$ be three points. If the equation of the bisector of the angle ABC is $\alpha x + \beta y = 5$, then the value of $\alpha^2 + \beta^2$ is

Options 1. 10

- 2. 8
- 3. 13
- 4. 5

Question Type : MCQ

Question ID : 444792538

Option 1 ID : 4447921836

Option 2 ID : 4447921835

Option 3 ID : 4447921837

Option 4 ID : 4447921834

Status : Not Answered

Chosen Option : --

Q.19 If the domain of the function

$$f(x) = \log_{(10x^2 - 17x + 7)}(18x^2 - 11x + 1)$$

is $(-\infty, a) \cup (b, c) \cup (d, \infty) - \{e\}$, then

$90(a + b + c + d + e)$ equals:

Options 1. 177

- 2. 170
- 3. 307
- 4. 316

Question Type : MCQ

Question ID : 444792527

Option 1 ID : 4447921793

Option 2 ID : 4447921792

Option 3 ID : 4447921791

Option 4 ID : 4447921790

Status : Not Answered

Chosen Option : --

Q.20 If $\cot x = \frac{5}{12}$ for some $x \in \left(\pi, \frac{3\pi}{2}\right)$, then $\sin 7x \left(\cos \frac{13x}{2} + \sin \frac{13x}{2} \right) + \cos 7x \left(\cos \frac{13x}{2} - \sin \frac{13x}{2} \right)$ is equal to

Options

1. $\frac{1}{\sqrt{13}}$
2. $\frac{4}{\sqrt{26}}$
3. $\frac{5}{\sqrt{13}}$
4. $\frac{6}{\sqrt{26}}$

Question Type : MCQ
 Question ID : 444792537
 Option 1 ID : 4447921833
 Option 2 ID : 4447921831
 Option 3 ID : 4447921832
 Option 4 ID : 4447921830
 Status : Not Answered
 Chosen Option : --

Section : Mathematics Section B

Q.21 The number of 3×2 matrices A, which can be formed using the elements of the set $\{-2, -1, 0, 1, 2\}$ such that the sum of all the diagonal elements of $A^T A$ is 5, is _____

Given 36
 Answer :

Question Type : SA
 Question ID : 444792546
 Status : Answered

Q.22 Let a line L passing through the point P (1,1,1) be perpendicular to the lines $\frac{x-4}{4} = \frac{y-1}{1} = \frac{z-1}{1}$ and $\frac{x-17}{1} = \frac{y-71}{1} = \frac{z}{0}$. Let the line L intersect the yz-plane at the point Q. Another line parallel to L and passing through the point S (1, 0, -1) intersects the yz-plane at the point R. Then the square of the area of the parallelogram PQRS is equal to _____.

Given --
 Answer :

Question Type : SA
 Question ID : 444792548
 Status : Not Answered

Q.23

Let $(2a, a)$ be the largest interval in which the function $f(t) = \frac{|t+1|}{t^2}$, $t < 0$, is strictly decreasing. Then the local maximum value of the function $g(x) = 2 \log_e (x-2) + ax^2 + 4x - a$, $x > 2$, is _____

Given --

Answer :

Question Type : SA

Question ID : 444792549

Status : Not Answered

Q.24

Let a differentiable function f satisfy the equation $\int_0^{36} f\left(\frac{tx}{36}\right) dt = 4\alpha f(x)$.

If $y = f(x)$ is a standard parabola passing through the points $(2, 1)$ and $(-4, \beta)$, then β^0 is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 444792550

Status : Not Answered

Q.25

The number of numbers greater than 5000, less than 9000 and divisible by 3, that can be formed using the digits 0, 1, 2, 5, 9, if the repetition of the digits is allowed, is _____

Given --

Answer :

Question Type : SA

Question ID : 444792547

Status : Not Answered

Section : Physics Section A

Q.26 A boy throws a ball into air at 45° from the horizontal to land it on a roof of a building of height H . If the ball attains maximum height in 2 s and lands on the building in 3 s after launch, then value of H is _____ m.

$$(g = 10 \text{ m/s}^2)$$

Options 1. 25

2. 10

3. 15

4. 20

Question Type : MCQ

Question ID : 444792555

Option 1 ID : 4447921888

Option 2 ID : 4447921890

Option 3 ID : 4447921887

Option 4 ID : 4447921889

Status : Answered

Chosen Option : 3

Q.27 There are three co-centric conducting spherical shells A , B and C of radii a , b and c respectively ($c > b > a$) and they are charged with charge q_1 , q_2 and q_3 respectively. The potentials of the spheres A , B and C respectively, are :

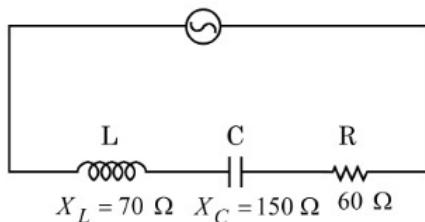
Options

1. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{a} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{b} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$
2. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{b} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$
3. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2}{b} + \frac{q_3}{c} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$
4. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{a} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2}{b} + \frac{q_3}{c} \right)$, $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right)$

Question Type : MCQ
 Question ID : 444792563
 Option 1 ID : 4447921921
 Option 2 ID : 4447921919
 Option 3 ID : 4447921920
 Option 4 ID : 4447921922
 Status : Answered
 Chosen Option : 3

Q.28 For the series LCR circuit connected with 220 V, 50 Hz a.c source as shown in the figure, the power factor is $\frac{\alpha}{10}$. The value of α is _____.

220 V, 50 Hz



Options 1. 4

2. 8
3. 10
4. 6

Question Type : MCQ
 Question ID : 444792562
 Option 1 ID : 4447921915
 Option 2 ID : 4447921917
 Option 3 ID : 4447921918
 Option 4 ID : 4447921916
 Status : Answered
 Chosen Option : 4

Q.29 An unpolarised light is incident at an interface of two dielectric media having refractive indices of 2 (incident medium) and $2\sqrt{3}$ (medium) respectively. To satisfy the condition that reflected and refracted rays are perpendicular to each other, the angle of incidence is _____.

Options 1. 45°
2. 30°
3. 10°
4. 60°

Question Type : MCQ
Question ID : 444792566
Option 1 ID : 4447921932
Option 2 ID : 4447921933
Option 3 ID : 4447921934
Option 4 ID : 4447921931
Status : Answered
Chosen Option : 4

Q.30 The exit surface of a prism with refractive index n is coated with a material having refractive index $\frac{n}{2}$. When this prism is set for minimum angle of deviation, it exactly meets the condition of critical angle. The prism angle is _____.

Options 1. 30°
2. 60°
3. 15°
4. 45°

Question Type : MCQ
Question ID : 444792568
Option 1 ID : 4447921940
Option 2 ID : 4447921941
Option 3 ID : 4447921939
Option 4 ID : 4447921942
Status : Answered
Chosen Option : 2

Q.31 A spring of force constant 15 N/m is cut into two pieces. If the ratio of their length is 1:3, then the force constant of smaller piece is _____ N/m.

Options 1. 60
2. 45
3. 20
4. 15

Question Type : MCQ
Question ID : 444792552
Option 1 ID : 4447921877
Option 2 ID : 4447921876
Option 3 ID : 4447921875
Option 4 ID : 4447921878
Status : Answered
Chosen Option : 4

Q.32 Two electrons are moving in orbits of two hydrogen like atoms with speeds 3×10^5 m/s and 2.5×10^5 m/s respectively. If the radii of these orbits are nearly same then the possible order of energy states are _____ respectively.

Options 1. 10 and 12

- 2. 8 and 10
- 3. 6 and 5
- 4. 9 and 8

Question Type : MCQ
Question ID : 444792570
Option 1 ID : 4447921948
Option 2 ID : 4447921950
Option 3 ID : 4447921949
Option 4 ID : 4447921947
Status : Answered
Chosen Option : 3

Q.33 A cylindrical block of mass M and area of cross section A is floating in a liquid of density ρ and with its axis vertical. When depressed a little and released the block starts oscillating. The period of oscillation is _____.

Options

- 1. $2\pi\sqrt{\frac{\rho A}{Mg}}$
- 2. $\pi\sqrt{\frac{\rho A}{Mg}}$
- 3. $2\pi\sqrt{\frac{M}{\rho Ag}}$
- 4. $\pi\sqrt{\frac{2M}{\rho Ag}}$

Question Type : MCQ
Question ID : 444792559
Option 1 ID : 4447921905
Option 2 ID : 4447921906
Option 3 ID : 4447921903
Option 4 ID : 4447921904
Status : Answered
Chosen Option : 3

Q.34 Match the **LIST-I** with **LIST-II**

List-I	List-II
A. Magnetic induction	I. $M L T^{-2} A^{-2}$
B. Magnetic flux	II. $M L^2 T^{-2} A^{-2}$
C. Magnetic permeability	III. $M L^0 T^{-2} A^{-1}$
D. Self inductance	IV. $M L^2 T^{-2} A^{-1}$

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

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

Question Type : MCQ
 Question ID : 444792551
 Option 1 ID : 4447921871
 Option 2 ID : 4447921873
 Option 3 ID : 4447921872
 Option 4 ID : 4447921874
 Status : Answered
 Chosen Option : 4

Q.35 A brass wire of length 2 m and radius 1 mm at $27^\circ C$ is held taut between two rigid supports. Initially it was cooled to a temperature of $-43^\circ C$ creating a tension T in the wire. The temperature to which the wire has to be cooled in order to increase the tension in it to $1.4T$, is _____ $^\circ C$.

Options 1. -71
 2. -65
 3. -80
 4. -86

Question Type : MCQ
 Question ID : 444792558
 Option 1 ID : 4447921900
 Option 2 ID : 4447921902
 Option 3 ID : 4447921901
 Option 4 ID : 4447921899
 Status : Answered
 Chosen Option : 1

Q.36 Two resistors of $100\ \Omega$ each are connected in series with a 9 V battery. A voltmeter of $400\ \Omega$ resistance is connected to measure the voltage drop across one of the resistors. The voltmeter reading is _____ V.

Options 1. 2

2. 3

3. 4

4. 4.5

Question Type : MCQ

Question ID : 444792561

Option 1 ID : 4447921911

Option 2 ID : 4447921912

Option 3 ID : 4447921913

Option 4 ID : 4447921914

Status : Answered

Chosen Option : 3

Q.37 Two masses 400 g and 350 g are suspended from the ends of a light string passing over a heavy pulley of radius 2 cm. When released from rest the heavier mass is observed to fall 81 cm in 9 s. The rotational inertia of the pulley is _____ kg.m^2 .
($g = 9.8\ \text{m/s}^2$)

Options 1. 9.5×10^{-3}

2. 1.86×10^{-2}

3. 8.3×10^{-3}

4. 4.75×10^{-3}

Question Type : MCQ

Question ID : 444792556

Option 1 ID : 4447921892

Option 2 ID : 4447921893

Option 3 ID : 4447921891

Option 4 ID : 4447921894

Status : Answered

Chosen Option : 2

Q.38 Given below are two statements:

Statement I: For all elements, greater the mass of the nucleus, greater is the binding energy per nucleon.

Statement II: For all elements, nuclei with less binding energy per nucleon transforms to nuclei with greater binding energy per nucleon.

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

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

2. Both Statement I and Statement II are 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 : 444792569
Option 1 ID : 4447921945
Option 2 ID : 4447921944
Option 3 ID : 4447921946
Option 4 ID : 4447921943
Status : Answered
Chosen Option : 1

Q.39 In a microscope of tube length 10 cm two convex lenses are arranged with focal length of 2 cm and 5 cm. Total magnification obtained with this system for normal adjustment is $(5)^k$. The value of k is _____.

Options 1. 4

2. 5

3. 3.5

4. 2

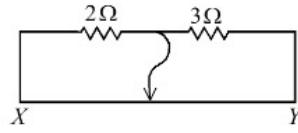
Question Type : MCQ
Question ID : 444792567
Option 1 ID : 4447921935
Option 2 ID : 4447921937
Option 3 ID : 4447921938
Option 4 ID : 4447921936
Status : Not Answered
Chosen Option : --

Q.40 The electrostatic potential in a charged spherical region of radius r varies as $V = ar^3 + b$, where a and b are constants. The total charge in the sphere of unit radius is $a \times \pi a \epsilon_0$. The value of a is _____. (permittivity of vacuum is ϵ_0)

Options 1. - 8
2. - 12
3. - 9
4. - 6

Question Type : MCQ
Question ID : 444792560
Option 1 ID : 4447921909
Option 2 ID : 4447921907
Option 3 ID : 4447921910
Option 4 ID : 4447921908
Status : Answered
Chosen Option : 2

Q.41 Two resistors 2Ω and 3Ω are connected in the gaps of bridge as shown in figure. The null point is obtained with the contact of jockey at some point on wire XY . When an unknown resistor is connected in parallel with 3Ω resistor, the null point is shifted by 22.5 cm toward Y . The resistance of unknown resistor is _____ Ω .



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

Question Type : MCQ
Question ID : 444792553
Option 1 ID : 4447921880
Option 2 ID : 4447921881
Option 3 ID : 4447921882
Option 4 ID : 4447921879
Status : Answered
Chosen Option : 1

Q.42 Three masses 200 kg, 300 kg and 400 kg are placed at the vertices of an equilateral triangle with sides 20 m. They are rearranged on the vertices of a bigger triangle of side 25 m and with the same centre. The work done in this process _____ J.
(Gravitational constant $G = 6.7 \times 10^{-11} \text{ N m}^2/\text{kg}^2$)

Options 1. 9.86×10^{-6}
2. 2.85×10^{-7}
3. 4.77×10^{-7}
4. 1.74×10^{-7}

Question Type : MCQ
Question ID : 444792554
Option 1 ID : 4447921884
Option 2 ID : 4447921885
Option 3 ID : 4447921883
Option 4 ID : 4447921886
Status : Answered
Chosen Option : 4

Q.43 Match the **LIST-I** with **LIST-II**

List-I		List-II	
A.	Radio-wave	I.	is produced by Magnetron valve
B.	Micro-wave	II.	due to change in the vibrational modes of atoms
C.	Infrared-wave	III.	due to inner shell electrons moving from higher energy level to lower energy level
D.	X-ray	IV.	due to rapid acceleration of electrons

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

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

Question Type : MCQ
Question ID : 444792565
Option 1 ID : 4447921930
Option 2 ID : 4447921927
Option 3 ID : 4447921928
Option 4 ID : 4447921929
Status : Answered
Chosen Option : 1

Q.44 Three charges $+2q$, $+3q$ and $-4q$ are situated at $(0, -3a)$, $(2a, 0)$ and $(-2a, 0)$ respectively in the xy plane. The resultant dipole moment about origin is _____.

Options

- $2qa(7\hat{i} - 3\hat{j})$
- $2qa(3\hat{j} - 7\hat{i})$
- $2qa(3\hat{j} - \hat{i})$
- $2qa(3\hat{i} - 7\hat{j})$

Question Type : MCQ
Question ID : 444792564
Option 1 ID : 4447921923
Option 2 ID : 4447921926
Option 3 ID : 4447921924
Option 4 ID : 4447921925
Status : Answered
Chosen Option : 2

Q.45 Density of water at 4°C and 20°C are 1000 kg/m^3 and 998 kg/m^3 respectively.

The increase in internal energy of 4 kg of water when it is heated from 4°C to 20°C is _____ J.

(specific heat capacity of water = 4.2 J/kg , and 1 atmospheric pressure = 10^5 Pa)

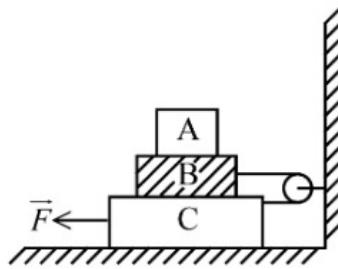
Options

- 315826.2
- 258700.8
- 234699.2
- 268799.2

Question Type : MCQ
Question ID : 444792557
Option 1 ID : 4447921896
Option 2 ID : 4447921895
Option 3 ID : 4447921898
Option 4 ID : 4447921897
Status : Answered
Chosen Option : 4

Section : Physics Section B

Q.46 In the given figure the blocks A, B and C weigh 4 kg, 6 kg and 8 kg respectively. The co-efficient of sliding friction between any two surfaces is 0.5. The force \vec{F} required to slide the block C with constant speed is ____ N. (Use $g = 10 \text{ m/s}^2$)



Given --
Answer :

Question Type : SA
Question ID : 444792572
Status : Not Answered

Q.47 A voltage regulating circuit consisting of Zener diode, having break-down voltage of 10 V and maximum power dissipation of 0.4 W, is operated at 15 V. The approximate value of protective resistance in this circuit is ____ Ω .

Given --
Answer :

Question Type : SA
Question ID : 444792571
Status : Not Answered

Q.48 A short bar magnet placed with its axis at 30° with an external field of 800 Gauss, experiences a torque of 0.016 N.m. The work done in moving it from most stable to most unstable position is $\alpha \times 10^{-3}$ J. The value of α is ____.

Given 64
Answer :

Question Type : SA
Question ID : 444792575
Status : Answered

Q.49 A gas of certain mass filled in a closed cylinder at a pressure of 3.23 kPa has temperature 50°C . The gas is now heated to double its temperature. The modified pressure is ____ Pa.

Given 7
Answer :

Question Type : SA
Question ID : 444792574
Status : Answered

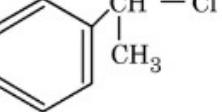
Q.50 Sixty four rain drops of radius 1 mm each falling down with a terminal velocity of 10 cm/s coalesce to form a bigger drop. The terminal velocity of bigger drop is _____ cm/s.

Given 80
Answer :

Question Type : SA
Question ID : 444792573
Status : Answered

Section : Chemistry Section A

Q.51 Match the LIST-I with LIST-II

List-I Chloro derivative		List-II Example	
A.	Vinyl Chloride	I.	$\text{CH}_2 = \text{CH} - \text{CH}_2\text{Cl}$
B.	Benzyl Chloride	II.	$\text{CH}_3 - \text{CH}(\text{Cl})\text{CH}_3$
C.	Alkyl Chloride	III.	$\text{CH}_2 = \text{CHCl}$
D.	Allyl Chloride	IV.	

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

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

Question Type : MCQ
Question ID : 444792591
Option 1 ID : 4447922018
Option 2 ID : 4447922017
Option 3 ID : 4447922016
Option 4 ID : 4447922019
Status : Answered
Chosen Option : 2

Q.52 At 27 °C in presence of a catalyst, activation energy of a reaction is lowered by 10 kJ mol⁻¹. The logarithm of ratio of $\frac{k(\text{catalysed})}{k(\text{uncatalysed})}$ is....

(Consider that the frequency factor for both the reactions is same)

Options 1. 0.1741
2. 1.741
3. 3.482
4. 17.41

Question Type : MCQ
Question ID : 444792581
Option 1 ID : 4447921976
Option 2 ID : 4447921977
Option 3 ID : 4447921979
Option 4 ID : 4447921978
Status : Answered
Chosen Option : 4

Q.53 A hydroxy compound (X) with molar mass 122 g mol⁻¹ is acetylated with acetic anhydride, using a large excess of the reagent ensuring complete acetylation of all hydroxyl groups. The product obtained has a molar mass of 290 g mol⁻¹. The number of hydroxyl groups present in compound (X) is:

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

Question Type : MCQ
Question ID : 444792594
Option 1 ID : 4447922028
Option 2 ID : 4447922029
Option 3 ID : 4447922031
Option 4 ID : 4447922030
Status : Answered
Chosen Option : 3

Q.54 Consider three metal chlorides x, y and z, where x is water soluble at room temperature, y is sparingly soluble in water at room temperature and z is soluble in hot water. x, y and z are respectively

Options 1. AlCl₃, PbCl₂ and BaCl₂
2. AgCl, Hg₂Cl₂ and PbCl₂
3. CuCl₂, AgCl and PbCl₂
4. MgCl₂, AgCl and AlCl₃

Question Type : MCQ
Question ID : 444792595
Option 1 ID : 4447922032
Option 2 ID : 4447922034
Option 3 ID : 4447922033
Option 4 ID : 4447922035
Status : Answered
Chosen Option : 3

Q.55 Given below are statements about some molecules/ions.

Identify the **CORRECT** statements.

- A. The dipole moment value of NF_3 is higher than that of NH_3 .
- B. The dipole moment value of BeH_2 is zero.
- C. The bond order of O_2^{2-} and F_2 is same.
- D. The formal charge on the central oxygen atom of ozone is -1 .
- E. In NO_2 , all the three atoms satisfy the octet rule, hence it is very stable.

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

Options 1. A, B, C, D & E

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

Question Type : MCQ
Question ID : 444792578
Option 1 ID : 4447921964
Option 2 ID : 4447921965
Option 3 ID : 4447921966
Option 4 ID : 4447921967
Status : Answered
Chosen Option : 3

Q.56 A \rightarrow D is an endothermic reaction occurring in three steps (elementary).

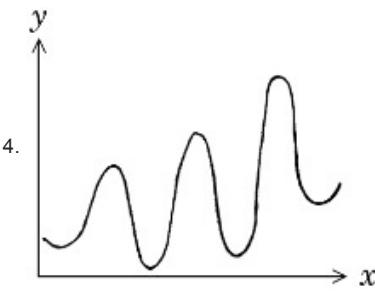
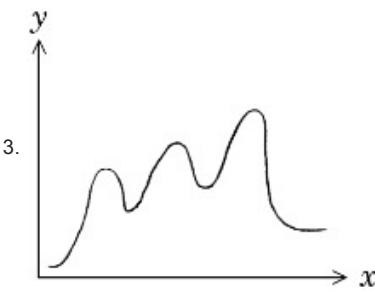
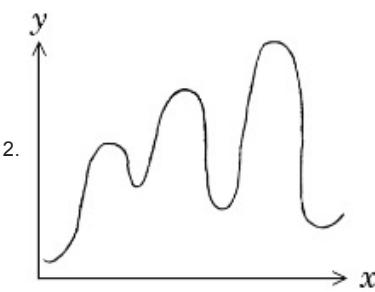
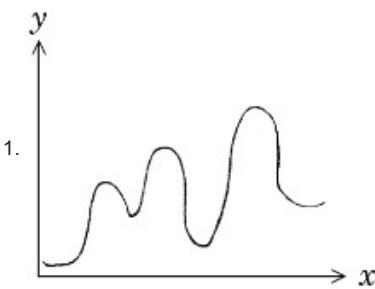
(i) A \rightarrow B $\Delta H_i = +ve$

(ii) B \rightarrow C $\Delta H_{ii} = -ve$

(iii) C \rightarrow D $\Delta H_{iii} = -ve$

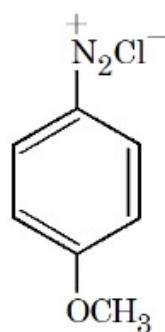
Which of the following graphs between potential energy (y-axis) vs reaction coordinate (x-axis) correctly represents the reaction profile of A \rightarrow D?

Options

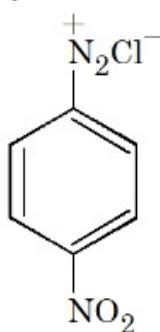


Question Type : MCQ
Question ID : 444792582
Option 1 ID : 4447921980
Option 2 ID : 4447921981
Option 3 ID : 4447921983
Option 4 ID : 4447921982
Status : Answered
Chosen Option : 2

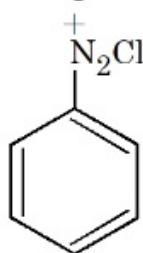
Q.57 The correct stability order of the following diazonium salts is



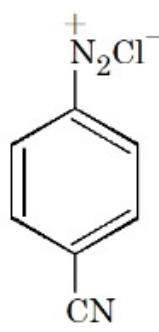
(A)



(B)



(C)



(D)

Options 1. A > C > D > B

2. A > B > C > D

3. C > D > B > A

4. C > A > D > B

Question Type : MCQ

Question ID : 444792593

Option 1 ID : 4447922025

Option 2 ID : 4447922024

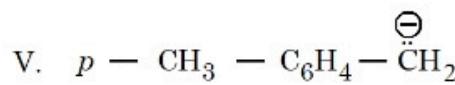
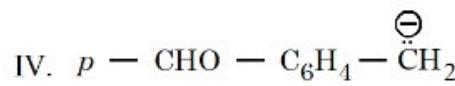
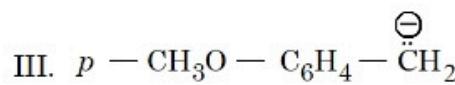
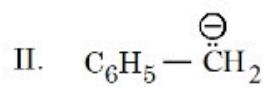
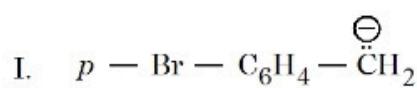
Option 3 ID : 4447922027

Option 4 ID : 4447922026

Status : Answered

Chosen Option : 1

Q.58 Arrange the following carbanions in the decreasing order of stability.



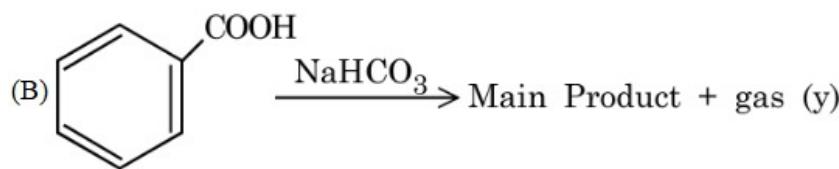
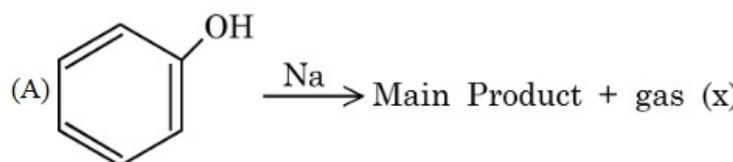
Choose the **correct** answer from the options given below:

Options

- 1. IV > I > II > V > III
- 2. I > IV > II > V > III
- 3. I > II > IV > V > III
- 4. IV > II > I > III > V

Question Type : MCQ
Question ID : 444792588
Option 1 ID : 4447922004
Option 2 ID : 4447922006
Option 3 ID : 4447922007
Option 4 ID : 4447922005
Status : Answered
Chosen Option : 1

Q.59 Consider the following two reactions A and B.



Numerical value of [molar mass of x + molar mass of y] is ____.

Options

1. 46
2. 88
3. 160
4. 4

Question Type : MCQ
Question ID : 444792592
Option 1 ID : 4447922020
Option 2 ID : 4447922022
Option 3 ID : 4447922021
Option 4 ID : 4447922023
Status : Answered
Chosen Option : 1

Q.60 'W' g of a non-volatile electrolyte solid solute of molar mass 'M' g mol⁻¹ when dissolved in 100 mL water, decreases vapour pressure of water from 640 mm Hg to 600 mm Hg. If aqueous solution of the electrolyte boils at 375 K and K_b for water is 0.52 K kg mol⁻¹, then the mole fraction of the electrolyte solute (x₂) in the solution can be expressed as
(Given : density of water = 1 g/mL and boiling point of water = 373 K)

Options

1. $\frac{1.3}{8} \times \frac{M}{W}$
2. $\frac{2.6}{16} \times \frac{M}{W}$
3. $\frac{1.3}{8} \times \frac{W}{M}$
4. $\frac{16}{2.6} \times \frac{W}{M}$

Question Type : MCQ
Question ID : 444792580
Option 1 ID : 4447921972
Option 2 ID : 4447921973
Option 3 ID : 4447921974
Option 4 ID : 4447921975
Status : Answered
Chosen Option : 4

Q.61 Match the **LIST-I** with **LIST-II**

List-I Isothermal process for ideal gas system		List-II Work done ($V_f > V_i$)	
A.	Reversible expansion	I.	$w = 0$
B.	Free expansion	II.	$w = -nRT \ln \frac{V_f}{V_i}$
C.	Irreversible expansion	III.	$w = -p_{ex}(V_f - V_i)$
D.	Irreversible compression	IV.	$w = -p_{ex}(V_i - V_f)$

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

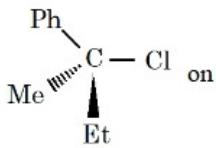
Options 1. A-II, B-I, C-III, D-IV
 2. A-IV, B-I, C-III, D-II
 3. A-I, B-III, C-II, D-IV
 4. A-IV, B-II, C-III, D-I

Question Type : MCQ
 Question ID : 444792577
 Option 1 ID : 4447921961
 Option 2 ID : 4447921962
 Option 3 ID : 4447921963
 Option 4 ID : 4447921960
 Status : Answered
 Chosen Option : 1

Q.62 Given below are two statements:

Statement I: 'C – Cl' bond is stronger in $\text{CH}_2 = \text{CH} - \text{Cl}$ than $\text{CH}_3 - \text{CH}_2 - \text{Cl}$

Statement II: The given optically active molecule,



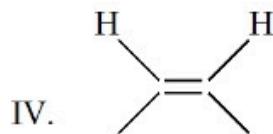
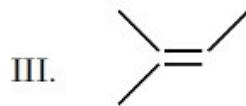
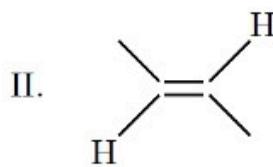
hydrolysis gives a solution that can rotate the plane polarized light.

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. Both Statement I and Statement II are true
 4. Statement I is false but Statement II is true

Question Type : MCQ
 Question ID : 444792590
 Option 1 ID : 4447922013
 Option 2 ID : 4447922014
 Option 3 ID : 4447922012
 Option 4 ID : 4447922015
 Status : Answered
 Chosen Option : 3

Q.63 Arrange the following alkenes in decreasing order of stability.



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

Options

- 1. III > II > I > IV
- 2. I > III > II > IV
- 3. III > I > II > IV
- 4. I > III > IV > II

Question Type : MCQ
Question ID : 444792589
Option 1 ID : 4447922008
Option 2 ID : 4447922010
Option 3 ID : 4447922009
Option 4 ID : 4447922011
Status : Answered
Chosen Option : 2

Q.64 Given below are two statements:

Statement I: Hybridisation, shape and spin only magnetic moment of $K_3[Co(CO_3)_3]$ is sp^3d^2 , octahedral and 4.9 BM respectively.

Statement II: Geometry, hybridisation and spin only magnetic moment values (BM) of the ions $[Ni(CN)_4]^{2-}$, $[MnBr_4]^{2-}$ and $[CoF_6]^{3-}$ respectively are square planar, tetrahedral, octahedral; dsp^2 , sp^3 , sp^3d^2 and 0, 5.9, 4.9.

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. 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 : 444792585
Option 1 ID : 4447921995
Option 2 ID : 4447921994
Option 3 ID : 4447921992
Option 4 ID : 4447921993
Status : Answered
Chosen Option : 1

Q.65 Given below are two statements:

Statement I: $K > Mg > Al > B$ is the correct order in terms of metallic character.

Statement II: Atomic radius is always greater than the ionic radius for any element.

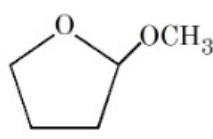
In the light of the above statements, choose the *correct* answer from the options given below

Options

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

Question Type : MCQ
Question ID : 444792583
Option 1 ID : 4447921987
Option 2 ID : 4447921986
Option 3 ID : 4447921985
Option 4 ID : 4447921984
Status : Answered
Chosen Option : 2

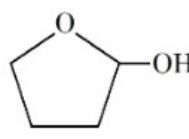
Q.66 A student is given one compound among the following compounds that gives positive test with Tollen's reagent.



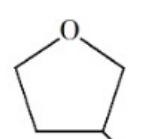
A



B



C



D

The compound is :

Options 1. **B**

- 2. **A**
- 3. **C**
- 4. **D**

Question Type : MCQ
Question ID : 444792587
Option 1 ID : 4447922001
Option 2 ID : 4447922000
Option 3 ID : 4447922002
Option 4 ID : 4447922003
Status : Answered
Chosen Option : 3

Q.67 Consider a mixture 'X' which is made by dissolving 0.4 mol of $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Br}$ and 0.4 mol of $[\text{Co}(\text{NH}_3)_5\text{Br}]\text{SO}_4$ in water to make 4 L of solution. When 2 L of mixture 'X' is allowed to react with excess of AgNO_3 , it forms precipitate 'Y'. The rest 2 L of mixture 'X' reacts with excess BaCl_2 to form precipitate 'Z'. Which of the following statements is **CORRECT**?

Options 1. 'Y' is BaSO_4 and 'Z' is AgBr .

- 2. 0.1 mol of 'Y' is formed.
- 3. 0.2 mol of 'Z' is formed.
- 4. 0.4 mol of 'Z' is formed.

Question Type : MCQ
Question ID : 444792576
Option 1 ID : 4447921959
Option 2 ID : 4447921957
Option 3 ID : 4447921958
Option 4 ID : 4447921956
Status : Answered
Chosen Option : 3

Q.68 A solution is prepared by dissolving 0.3 g of a non-volatile non-electrolyte solute 'A' of molar mass 60 g mol^{-1} and 0.9 g of a non-volatile non-electrolyte solute 'B' of molar mass 180 g mol^{-1} in 100 mL H_2O at 27°C . Osmotic pressure of the solution will be
[Given: $R = 0.082 \text{ L atm K}^{-1} \text{ mol}^{-1}$]

Options

- 1. 1.23 atm
- 2. 0.82 atm
- 3. 2.46 atm
- 4. 1.47 atm

Question Type : MCQ
Question ID : 444792579
Option 1 ID : 4447921969
Option 2 ID : 4447921968
Option 3 ID : 4447921971
Option 4 ID : 4447921970
Status : Answered
Chosen Option : 3

Q.69 Given below are two statements:

Statement I: The number of paramagnetic species among $[\text{CoF}_6]^{3-}$, $[\text{TiF}_6]^{3-}$, V_2O_5 and $[\text{Fe}(\text{CN})_6]^{3-}$ is 3.

Statement II:
 $\text{K}_4[\text{Fe}(\text{CN})_6] < \text{K}_3[\text{Fe}(\text{CN})_6] < [\text{Fe}(\text{H}_2\text{O})_6]\text{SO}_4 \cdot \text{H}_2\text{O} < [\text{Fe}(\text{H}_2\text{O})_6]\text{Cl}_3$ is the correct order in terms of number of unpaired electron(s) present in the complexes.

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

Question Type : MCQ
Question ID : 444792586
Option 1 ID : 4447921997
Option 2 ID : 4447921999
Option 3 ID : 4447921998
Option 4 ID : 4447921996
Status : Answered
Chosen Option : 4

Q.70 Among the following, the CORRECT combinations are

- A. $\text{IF}_3 \rightarrow$ T-shaped (sp^3d)
- B. $\text{IF}_5 \rightarrow$ Square pyramidal (sp^3d^2)
- C. $\text{IF}_7 \rightarrow$ Pentagonal bipyramidal (sp^3d^3)
- D. $\text{ClO}_4^- \rightarrow$ Square planar (sp^2d)

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

Options

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

Question Type : MCQ
Question ID : 444792584
Option 1 ID : 4447921988
Option 2 ID : 4447921989
Option 3 ID : 4447921990
Option 4 ID : 4447921991
Status : Answered
Chosen Option : 1

Section : Chemistry Section B

Q.71 The hydrogen spectrum consists of several spectral lines in Lyman series ($\text{L}_1, \text{L}_2, \text{L}_3\dots$; L_1 has lowest energy among Lyman series). Similarly it consists of several spectral lines in Balmer series ($\text{B}_1, \text{B}_2, \text{B}_3 \dots$; B_1 has lowest energy among Balmer lines). The energy of L_1 is x times the energy of B_1 . The value of x is $\text{_____} \times 10^{-1}$. (Nearest integer)

Given 2

Answer :

Question Type : SA
Question ID : 444792598
Status : Answered

Q.72 X and Y are the number of electrons involved, respectively during the oxidation of I^- to I_2 and S^{2-} to S by acidified $\text{K}_2\text{Cr}_2\text{O}_7$. The value of $X + Y$ is _____ .

Given 4

Answer :

Question Type : SA
Question ID : 444792596
Status : Answered

Q.73 Consider two Group IV metal ions X^{2+} and Y^{2+} .

A solution containing 0.01 M X^{2+} and 0.01 M Y^{2+} is saturated with H_2S . The pH at which the metal sulphide YS will form as a precipitate is _____. (Nearest integer)

(Given: $K_{sp}(XS) = 1 \times 10^{-22}$ at 25°C, $K_{sp}(YS) = 4 \times 10^{-16}$ at 25°C,
[H_2S] = 0.1M in solution, $K_{a1} \times K_{a2}(H_2S) = 1.0 \times 10^{-21}$, $\log 2 = 0.30$,
 $\log 3 = 0.48$, $\log 5 = 0.70$)

Given --

Answer :

Question Type : SA

Question ID : 444792599

Status : Not Answered

Q.74 In Dumas method for estimation of nitrogen, 0.50 g of an organic compound gave 70 mL of nitrogen collected at 300 K and 715 mm pressure. The percentage of nitrogen in the organic compound is ____ %.
(Aqueous tension at 300 K is 15 mm).

Given 557

Answer :

Question Type : SA

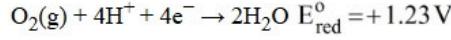
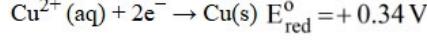
Question ID : 444792597

Status : Answered

Q.75

Electricity is passed through an acidic solution of Cu^{2+} till all the Cu^{2+} was exhausted, leading to the deposition of 300 mg of Cu metal. However, a current of 600 mA was continued to pass through the same solution for another 28 minutes by keeping the total volume of the solution fixed at 200 mL. The total volume of oxygen evolved at STP during the entire process is ____ mL. (Nearest integer)

[Given:



Molar mass of Cu = 63.54 g mol $^{-1}$

Molar mass of O₂ = 32 g mol $^{-1}$

Faraday Constant = 96500 C mol $^{-1}$

Molar volume at STP = 22.4 L]

Given --

Answer :

Question Type : SA

Question ID : 444792600

Status : Not Answered