

National Testing Agency

Question Paper Name :	B Tech 24th Jan 2026 Shift 1
Subject Name :	B. Tech
Duration :	180
Total Marks :	300
Display Marks:	Yes

B. Tech

Group Number :	1
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300

Mathematics Section A

Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 1 Question Id : 444792529 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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

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

$\alpha + \beta$ is equal to

Options :

4447921798. 73

4447921799. 74

4447921800. 75

4447921801. 76

Question Number : 2 Question Id : 444792539 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921838. 16

4447921839. 12

4447921840. 32

4447921841. 64

Question Number : 3 Question Id : 444792541 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921846. 320

4447921847. 340

4447921848. 348

4447921849. 360

Question Number : 4 Question Id : 444792530 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of the real solutions of the equation:

$$x|x+3| + |x-1| - 2 = 0 \text{ is}$$

Options :

4447921802. 2

4447921803. 3

4447921804. 5

4447921805. 4

Question Number : 5 Question Id : 444792545 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921862. $\frac{2}{3}(\sqrt{2} + 1)$

4447921863. $\frac{2}{3}(2\sqrt{2} + 1)$

4447921864. $\frac{2}{3}(3\sqrt{2}+1)$

4447921865. $\frac{2}{3}(4\sqrt{2}+1)$

Question Number : 6 Question Id : 444792526 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921786. 6

4447921787. 12

4447921788. 15

4447921789. 18

Question Number : 7 Question Id : 444792540 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921842. 0

4447921843. 1

4447921844. 3

4447921845. 11

Question Number : 8 Question Id : 444792535 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921822. $\frac{8}{5}$

4447921823. $\frac{16}{5}$

4447921824. $\frac{32}{5}$

4447921825. $\frac{96}{5}$

Question Number : 9 Question Id : 444792528 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921794. 385

4447921795. 398

4447921796. 413

4447921797. 423

Question Number : 10 Question Id : 444792544 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921858. $-1 - 2\sqrt{2}$

4447921859. $-1 - \sqrt{2}$

4447921860. $1 + \sqrt{2}$

4447921861. $-1 + \sqrt{2}$

Question Number : 11 Question Id : 444792532 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921810. 49

4447921811. 50

4447921812. 51

Question Number : 12 Question Id : 444792543 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921854. 24

4447921855. 36

4447921856. 48

4447921857. 84

Question Number : 13 Question Id : 444792533 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921814. 5

4447921815. 10

4447921816. 15

4447921817. 20

Question Number : 14 Question Id : 444792542 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921850. $\frac{1}{2}$

4447921851. $\frac{2}{3}$

4447921852. $\frac{3}{2}$

4447921853. 2

Question Number : 15 Question Id : 444792534 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921818. $\frac{73}{10^8}$

4447921819. $\frac{7}{10^7}$

4447921820. $\frac{81}{10^8}$

4447921821. $\frac{67}{10^8}$

Question Number : 16 Question Id : 444792531 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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

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

Options :

4447921806. 136

4447921807. 238

4447921808. 476

4447921809. 952

Question Number : 17 Question Id : 444792536 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921826. $\frac{5}{3}$

4447921827. $\frac{7}{3}$

4447921828. $\frac{8}{3}$

4447921829. $\frac{11}{3}$

Question Number : 18 Question Id : 444792538 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921834. 5

4447921835. 8

4447921836. 10

4447921837. 13

Question Number : 19 Question Id : 444792527 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921790. 316

4447921791. 307

4447921792. 170

4447921793. 177

Question Number : 20 Question Id : 444792537 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921830. $\frac{6}{\sqrt{26}}$

4447921831. $\frac{4}{\sqrt{26}}$

4447921832. $\frac{5}{\sqrt{13}}$

4447921833. $\frac{1}{\sqrt{13}}$

Mathematics Section B

Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 21 Question Id : 444792546 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript
 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 _____

Response Type : Numeric
 Evaluation Required For SA : Yes
 Show Word Count : Yes
 Answers Type : Equal
 Text Areas : PlainText

Question Number : 22 Question Id : 444792548 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript
 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 _____.

Response Type : Numeric
 Evaluation Required For SA : Yes
 Show Word Count : Yes
 Answers Type : Equal
 Text Areas : PlainText

Question Number : 23 Question Id : 444792549 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript
 Let $(2\alpha, \alpha)$ 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 $g(x) = 2 \log_e (x-2) + \alpha x^2 + 4x - \alpha$, $x > 2$, is _____

Response Type : Numeric
 Evaluation Required For SA : Yes
 Show Word Count : Yes
 Answers Type : Equal
 Text Areas : PlainText

Question Number : 24 Question Id : 444792550 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript
 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, β), then β^α is equal to _____.

Response Type : Numeric
 Evaluation Required For SA : Yes
 Show Word Count : Yes
 Answers Type : Equal
 Text Areas : PlainText

Question Number : 25 Question Id : 444792547 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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 _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Physics Section A

Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 26 Question Id : 444792555 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921887. 15

4447921888. 25

4447921889. 20

4447921890. 10

Question Number : 27 Question Id : 444792563 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921919. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{b} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$

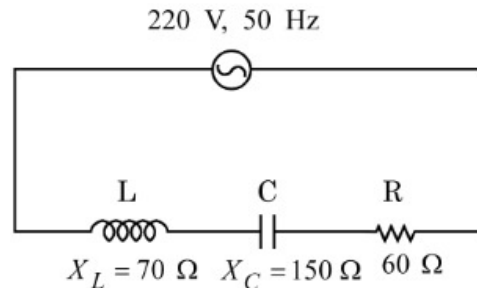
4447921920. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$

4447921921. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{a} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{b} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{c} \right)$

4447921922. $\frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2 + q_3}{a} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1 + q_2}{b} + \frac{q_3}{c} \right), \frac{1}{4\pi\epsilon_0} \left(\frac{q_1}{a} + \frac{q_2}{b} + \frac{q_3}{c} \right)$

Question Number : 28 Question Id : 444792562 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 _____.



Options :

4447921915. 4

4447921916. 6

4447921917. 8

4447921918. 10

Question Number : 29 Question Id : 444792566 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921931. 60°

4447921932. 45°

4447921933. 30°

4447921934. 10°

Question Number : 30 Question Id : 444792568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921939. 15°

4447921940. 30°

4447921941. 60°

4447921942. 45°

Question Number : 31 Question Id : 444792552 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921875. 20

4447921876. 45

4447921877. 60

4447921878. 15

Question Number : 32 Question Id : 444792570 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921947. 9 and 8

4447921948. 10 and 12

4447921949. 6 and 5

4447921950. 8 and 10

Question Number : 33 Question Id : 444792559 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921903. $2\pi\sqrt{\frac{M}{\rho Ag}}$

4447921904. $\pi\sqrt{\frac{2M}{\rho Ag}}$

4447921905. $2\pi\sqrt{\frac{\rho A}{Mg}}$

4447921906. $\pi\sqrt{\frac{\rho A}{Mg}}$

Question Number : 34 Question Id : 444792551 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Match the LIST-I with LIST-II

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

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

Options :

4447921871. A-III, B-IV, C-II, D-I

4447921872. A-IV, B-III, C-I, D-II

4447921873. A-I, B-III, C-IV, D-II

4447921874. A-III, B-IV, C-I, D-II

Question Number : 35 Question Id : 444792558 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A brass wire of length 2 m and radius 1 mm at 27 °C is held taut between two rigid supports. Initially it was cooled to a temperature of –43 °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 _____ °C.

Options :

4447921899. –86

4447921900. –71

4447921901. –80

4447921902. –65

Question Number : 36 Question Id : 444792561 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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

Options :

4447921911. 2

4447921912. 3

4447921913. 4

4447921914. 4.5

Question Number : 37 Question Id : 444792556 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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.m².
($g = 9.8 \text{ m/s}^2$)

Options :

4447921891. 8.3×10^{-3}

4447921892. 9.5×10^{-3}

4447921893. 1.86×10^{-2}

4447921894. 4.75×10^{-3}

Question Number : 38 Question Id : 444792569 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921943. Both Statement I and Statement II are true

4447921944. Both Statement I and Statement II are false

4447921945. Statement I is true but Statement II is false

4447921946. Statement I is false but Statement II is true

Question Number : 39 Question Id : 444792567 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921935. 4

4447921936. 2

4447921937. 5

4447921938. 3.5

Question Number : 40 Question Id : 444792560 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 $\alpha \times \pi a \epsilon_0$. The value of α is _____.
(permittivity of vacuum is ϵ_0)

Options :

4447921907. - 12

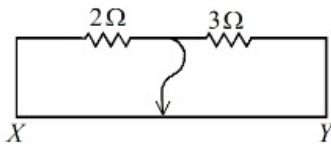
4447921908. - 6

4447921909. - 8

4447921910. - 9

Question Number : 41 Question Id : 444792553 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two resistors $2\ \Omega$ and $3\ \Omega$ 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 $3\ \Omega$ resistor, the null point is shifted by 22.5 cm toward Y . The resistance of unknown resistor is _____ Ω .



Options :

4447921879. 1

4447921880. 2

4447921881. 3

4447921882. 4

Question Number : 42 Question Id : 444792554 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 _____.
(Gravitational constant $G = 6.7 \times 10^{-11}\text{ N m}^2/\text{kg}^2$)

Options :

4447921883. 4.77×10^{-7}

4447921884. 9.86×10^{-6}

4447921885. 2.85×10^{-7}

4447921886. 1.74×10^{-7}

Question Number : 43 Question Id : 444792565 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
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 :

4447921927. A-IV, B-III, C-I, D-II

4447921928. A-IV, B-I, C-II, D-III

4447921929. A-II, B-IV, C-III, D-I

4447921930. A-IV, B-II, C-I, D-III

Question Number : 44 Question Id : 444792564 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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

Options :

4447921923. $2qa(7\hat{i} - 3\hat{j})$

4447921924. $2qa(3\hat{j} - \hat{i})$

4447921925. $2qa(3\hat{i} - 7\hat{j})$

4447921926. $2qa(3\hat{j} - 7\hat{i})$

Question Number : 45 Question Id : 444792557 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 $1\text{ atmospheric pressure} = 10^5\text{ Pa}$)

Options :

4447921895. 258700.8

4447921896. 315826.2

4447921897. 268799.2

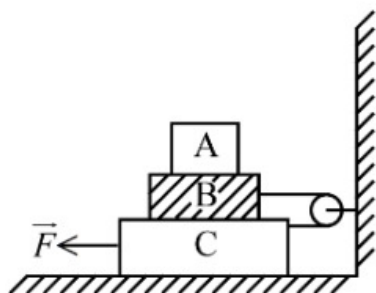
4447921898. 234699.2

Physics Section B

Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 46 Question Id : 444792572 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 47 Question Id : 444792571 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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 .

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 48 Question Id : 444792575 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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 _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 49 Question Id : 444792574 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal
Text Areas : PlainText

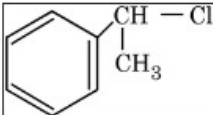
Question Number : 50 Question Id : 444792573 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript
Sixty four rain drops of radius 1 mm each falling down with a terminal velocity of 10 cm/s coalesce to form a bigger drop. The terminal velocity of bigger drop is _____ cm/s.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Chemistry Section A

Section Number : 5
Section type : Online
Mandatory or Optional : Mandatory
Number of Questions : 20
Number of Questions to be attempted : 20
Section Marks : 80
Maximum Instruction Time : 0
Sub-Section Number : 1
Question Shuffling Allowed : Yes
Is Section Default? : No

Question Number : 51 Question Id : 444792591 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
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 :

4447922016. A-I, B-II, C-IV, D-III

4447922017. A-III, B-IV, C-II, D-I

4447922018. A-III, B-IV, C-I, D-II

4447922019. A-IV, B-I, C-III, D-II

Question Number : 52 Question Id : 444792581 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921976. 0.1741

4447921977. 1.741

4447921978. 17.41

4447921979. 3.482

Question Number : 53 Question Id : 444792594 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447922028. 3

4447922029. 5

4447922030. 2

4447922031. 4

Question Number : 54 Question Id : 444792595 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447922032. AlCl_3 , PbCl_2 and BaCl_2

4447922033. CuCl_2 , AgCl and PbCl_2

4447922034. AgCl , Hg_2Cl_2 and PbCl_2

4447922035. MgCl_2 , AgCl and AlCl_3

Question Number : 55 Question Id : 444792578 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921964. A, B, C, D & E

4447921965. B & C Only

4447921966. B, C & D Only

4447921967. A, C & D Only

Question Number : 56 Question Id : 444792582 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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

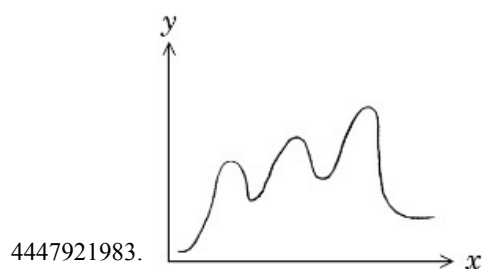
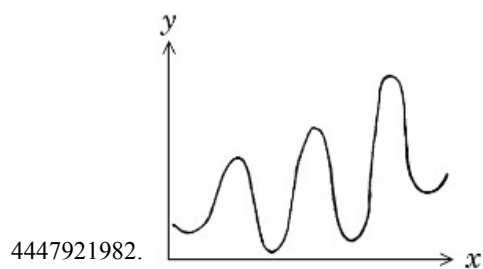
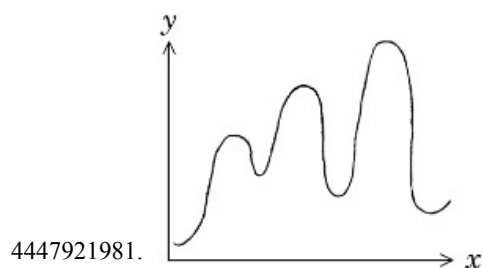
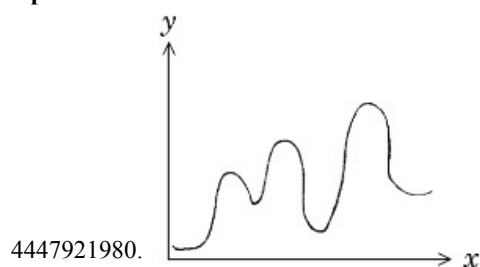
(i) A $\rightarrow$ B $\Delta H_i = +ve$

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

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

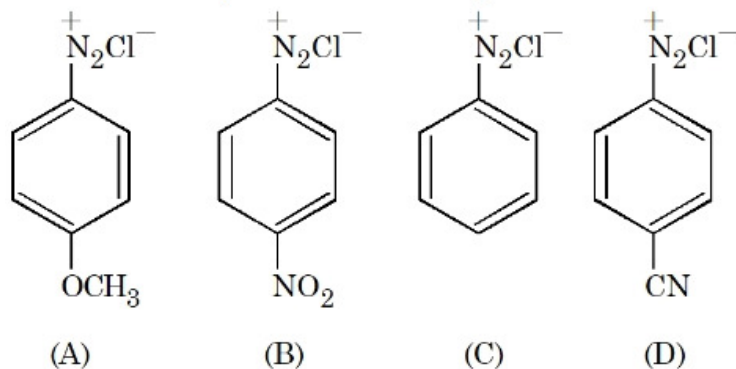
Which of the following graphs between potential energy (y-axis) vs reaction coordinate (x-axis) correctly represents the reaction profile of A $\rightarrow$ D?

Options :



Question Number : 57 Question Id : 444792593 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct stability order of the following diazonium salts is



Options :

4447922024. $A > B > C > D$

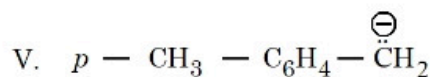
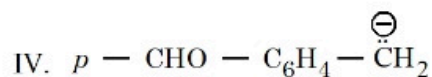
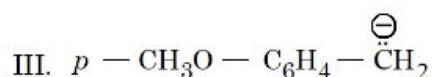
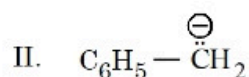
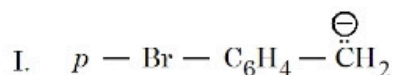
4447922025. $A > C > D > B$

4447922026. $C > A > D > B$

4447922027. $C > D > B > A$

Question Number : 58 Question Id : 444792588 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Arrange the following carbanions in the decreasing order of stability.



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

Options :

4447922004. $\text{IV} > \text{I} > \text{II} > \text{V} > \text{III}$

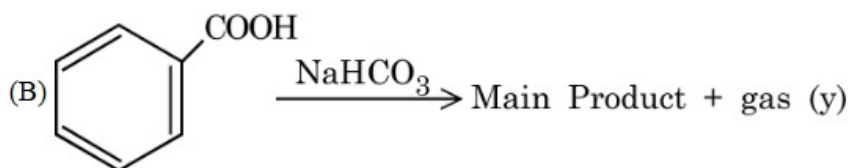
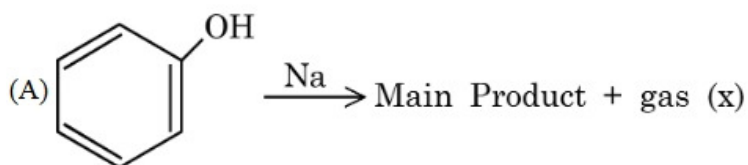
4447922005. $\text{IV} > \text{II} > \text{I} > \text{III} > \text{V}$

4447922006. $\text{I} > \text{IV} > \text{II} > \text{V} > \text{III}$

4447922007. $\text{I} > \text{II} > \text{IV} > \text{V} > \text{III}$

Question Number : 59 Question Id : 444792592 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the following two reactions A and B.



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

Options :

4447922020. 46

4447922021. 160

4447922022. 88

4447922023. 4

Question Number : 60 Question Id : 444792580 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

'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 :

4447921972. $\frac{1.3}{8} \times \frac{M}{W}$

4447921973. $\frac{2.6}{16} \times \frac{M}{W}$

4447921974. $\frac{1.3}{8} \times \frac{W}{M}$

4447921975. $\frac{16}{2.6} \times \frac{W}{M}$

Question Number : 61 Question Id : 444792577 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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.	$w = -p_{\text{ex}}(V_f - V_i)$
D.	Irreversible compression	IV.	$w = -p_{\text{ex}}(V_i - V_f)$

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

Options :

4447921960. A-IV, B-II, C-III, D-I

4447921961. A-II, B-I, C-III, D-IV

4447921962. A-IV, B-I, C-III, D-II

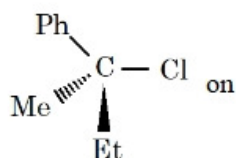
4447921963. A-I, B-III, C-II, D-IV

Question Number : 62 Question Id : 444792590 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

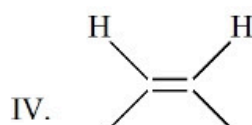
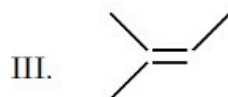
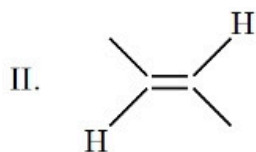
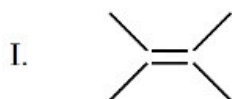
4447922012. Both Statement I and Statement II are true

4447922013. Both Statement I and Statement II are false

4447922014. Statement I is true but Statement II is false

4447922015. Statement I is false but Statement II is true

Question Number : 63 Question Id : 444792589 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Arrange the following alkenes in decreasing order of stability.



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

Options :

4447922008. III > II > I > IV

4447922009. III > I > II > IV

4447922010. I > III > II > IV

4447922011. I > III > IV > II

Question Number : 64 Question Id : 444792585 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
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 :

4447921992. Both Statement I and Statement II are true

4447921993. Both Statement I and Statement II are false

4447921994. Statement I is true but Statement II is false

4447921995. Statement I is false but Statement II is true

Question Number : 65 Question Id : 444792583 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Given below are two statements:

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

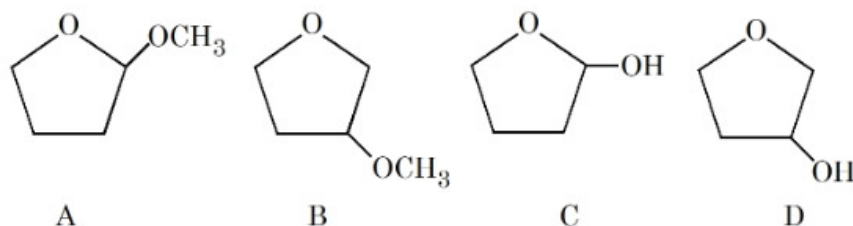
Statement II: Atomic radius is always greater than the ionic radius for any element.

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

Options :

4447921984. Both Statement I and Statement II are true
4447921985. Both Statement I and Statement II are false
4447921986. Statement I is true but Statement II is false
4447921987. Statement I is false but Statement II is true

Question Number : 66 Question Id : 444792587 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
A student is given one compound among the following compounds that gives positive test with Tollen's reagent.



The compound is :

Options :

4447922000. A
4447922001. B
4447922002. C
4447922003. D

Question Number : 67 Question Id : 444792576 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Consider a mixture 'X' which is made by dissolving 0.4 mol of $[Co(NH_3)_5SO_4]Br$ and 0.4 mol of $[Co(NH_3)_5Br]SO_4$ 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 :

4447921956. 0.4 mol of 'Z' is formed.
4447921957. 0.1 mol of 'Y' is formed.
4447921958. 0.2 mol of 'Z' is formed.

4447921959. 'Y' is BaSO_4 and 'Z' is AgBr .

Question Number : 68 Question Id : 444792579 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921968. 0.82 atm

4447921969. 1.23 atm

4447921970. 1.47 atm

4447921971. 2.46 atm

Question Number : 69 Question Id : 444792586 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

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 :

4447921996. Both Statement I and Statement II are true

4447921997. Both Statement I and Statement II are false

4447921998. Statement I is true but Statement II is false

4447921999. Statement I is false but Statement II is true

Question Number : 70 Question Id : 444792584 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Among the following, the CORRECT combinations are

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

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

Options :

4447921988. A, B, C and D

4447921989. B, C and D Only

4447921990. A and B Only

4447921991. A, B and C Only

Chemistry Section B

Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 71 Question Id : 444792598 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The hydrogen spectrum consists of several spectral lines in Lyman series ($L_1, L_2, L_3, \dots$; L_1 has lowest energy among Lyman series). Similarly it consists of several spectral lines in Balmer series ($B_1, B_2, B_3, \dots$; 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 $_____ \times 10^{-1}$. (Nearest integer)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 72 Question Id : 444792596 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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 $K_2Cr_2O_7$. The value of $X + Y$ is $_____$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 73 Question Id : 444792599 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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

A solution containing $0.01\text{ M } X^{2+}$ and $0.01\text{ M } Y^{2+}$ 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 , $[H_2S] = 0.1\text{M}$ in solution, $K_{a1} \times K_{a2}(H_2S) = 1.0 \times 10^{-21}$, $\log 2 = 0.30$, $\log 3 = 0.48$, $\log 5 = 0.70$)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 74 Question Id : 444792597 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

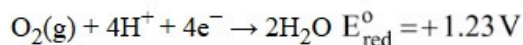
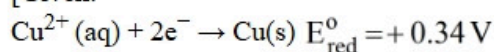
Answers Type : Equal

Text Areas : PlainText

Question Number : 75 Question Id : 444792600 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

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]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText