

Application No	
Candidate Name	
Roll No.	
Test Date	23/01/2026
Test Time	3:00 PM - 6:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 The system of linear equations

$$x + y + z = 6$$

$$2x + 5y + az = 36$$

$$x + 2y + 3z = b$$

has

- Options
1. infinitely many solutions for $a = 8$ and $b = 14$
 2. infinitely many solutions for $a = 8$ and $b = 16$
 3. unique solution for $a = 8$ and $b = 16$
 4. unique solution for $a = 8$ and $b = 14$

Question Type : MCQ

Question ID : 444792455

Option 1 ID : 4447921549

Option 2 ID : 4447921550

Option 3 ID : 4447921548

Option 4 ID : 4447921547

Status : Not Answered

Chosen Option : --

Q.2 If the mean and the variance of the data

Class	4-8	8-12	12-16	16-20
Frequency	3	λ	4	7

are μ and 19 respectively, then the value of $\lambda + \mu$ is

- Options
1. 21
 2. 18
 3. 19
 4. 20

Question Type : MCQ

Question ID : 444792459

Option 1 ID : 4447921566

Option 2 ID : 4447921563

Option 3 ID : 4447921564

Option 4 ID : 4447921565

Status : Not Answered

Chosen Option : --

Q.3

Let $I(x) = \int \frac{3dx}{(4x+6)(\sqrt{4x^2+8x+3})}$ and $I(0) = \frac{\sqrt{3}}{4} + 20$. If

$I\left(\frac{1}{2}\right) = \frac{a\sqrt{2}}{b} + c$, where $a, b, c \in \mathbb{N}$, $\gcd(a, b) = 1$, then $a + b + c$ is equal to

Options 1. 29

2. 28

3. 30

4. 31

Question Type : MCQ

Question ID : 444792469

Option 1 ID : 4447921604

Option 2 ID : 4447921603

Option 3 ID : 4447921605

Option 4 ID : 4447921606

Status : Not Answered

Chosen Option : --

Q.4 An equilateral triangle OAB is inscribed in the parabola $y^2 = 4x$ with the vertex O at the vertex of the parabola. Then the minimum distance of the circle having AB as a diameter from the origin is

Options 1. $4(6 + \sqrt{3})$ 2. $4(3 - \sqrt{3})$ 3. $2(8 - 3\sqrt{3})$ 4. $2(3 + \sqrt{3})$

Question Type : MCQ

Question ID : 444792461

Option 1 ID : 4447921572

Option 2 ID : 4447921574

Option 3 ID : 4447921571

Option 4 ID : 4447921573

Status : Not Answered

Chosen Option : --

Q.5 The sum of all the real solutions of the equation $\log_{(x+3)}(6x^2 + 28x + 30) = 5 - 2\log_{(6x+10)}(x^2 + 6x + 9)$ is equal to

- Options 1. 1
2. 0
3. 2
4. 4

Question Type : MCQ

Question ID : 444792453

Option 1 ID : 4447921540

Option 2 ID : 4447921539

Option 3 ID : 4447921541

Option 4 ID : 4447921542

Status : Not Answered

Chosen Option : --

Q.6 The least value of $(\cos^2 \theta - 6\sin \theta \cos \theta + 3\sin^2 \theta + 2)$ is

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

Question Type : MCQ

Question ID : 444792468

Option 1 ID : 4447921601

Option 2 ID : 4447921599

Option 3 ID : 4447921600

Option 4 ID : 4447921602

Status : Not Answered

Chosen Option : --

Q.7 Let $A = \{0, 1, 2, \dots, 9\}$. Let R be a relation on A defined by $(x, y) \in R$ if and only if $|x - y|$ is a multiple of 3.

Given below are two statements:

Statement I: $n(R) = 36$.

Statement II: R is an equivalence relation.

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

Question Type : MCQ

Question ID : 444792451

Option 1 ID : 4447921531

Option 2 ID : 4447921532

Option 3 ID : 4447921534

Option 4 ID : 4447921533

Status : Not Answered

Chosen Option : --

Q.8 The area of the region enclosed between the circles $x^2 + y^2 = 4$ and $x^2 + (y - 2)^2 = 4$ is:

- Options**
1. $\frac{4}{3}(2\pi - 3\sqrt{3})$
 2. $\frac{2}{3}(4\pi - 3\sqrt{3})$
 3. $\frac{4}{3}(2\pi - \sqrt{3})$
 4. $\frac{2}{3}(2\pi - 3\sqrt{3})$

Question Type : **MCQ**

Question ID : **444792470**

Option 1 ID : **4447921607**

Option 2 ID : **4447921608**

Option 3 ID : **4447921610**

Option 4 ID : **4447921609**

Status : **Not Answered**

Chosen Option : --

Q.9 Bag A contains 9 white and 8 black balls, while bag B contains 6 white and 4 black balls. One ball is randomly picked up from the bag B and mixed up with the balls in the bag A. Then a ball is randomly drawn from the bag A. If the probability, that the ball drawn is white, is $\frac{p}{q}$, $\gcd(p, q) = 1$, then $p + q$ is equal to

- Options**
1. 23
 2. 22
 3. 21
 4. 24

Question Type : **MCQ**

Question ID : **444792458**

Option 1 ID : **4447921559**

Option 2 ID : **4447921560**

Option 3 ID : **4447921561**

Option 4 ID : **4447921562**

Status : **Not Answered**

Chosen Option : --

Q.10 If the points of intersection of the ellipses $x^2 + 2y^2 - 6x - 12y + 23 = 0$ and $4x^2 + 2y^2 - 20x - 12y + 35 = 0$ lie on a circle of radius r and centre (a, b) , then the value of $ab + 18r^2$ is

- Options 1. 53
2. 51
3. 55
4. 52

Question Type : **MCQ**

Question ID : 444792460

Option 1 ID : 4447921569

Option 2 ID : 4447921567

Option 3 ID : 4447921568

Option 4 ID : 4447921570

Status : **Not Answered**

Chosen Option : --

Q.11 If $f(x) = \begin{cases} \frac{a|x| + x^2 - 2(\sin|x|)(\cos|x|)}{x} & , x \neq 0 \\ b & , x = 0 \end{cases}$

is continuous at $x = 0$, then $a + b$ is equal to

- Options 1. 0
2. 1
3. 4
4. 2

Question Type : **MCQ**

Question ID : 444792467

Option 1 ID : 4447921595

Option 2 ID : 4447921596

Option 3 ID : 4447921598

Option 4 ID : 4447921597

Status : **Answered**

Chosen Option : 4

Q.12 Let $\vec{a}, \vec{b}, \vec{c}$ be three vectors such that $\vec{a} \times \vec{b} = 2(\vec{a} \times \vec{c})$. If $|\vec{a}| = 1, |\vec{b}| = 4, |\vec{c}| = 2$, and the angle between $\vec{b}$ and $\vec{c}$ is 60° , then $|\vec{a} \cdot \vec{c}|$ is equal to

- Options 1. 4
2. 2
3. 0
4. 1

Question Type : **MCQ**

Question ID : 444792466

Option 1 ID : 4447921594

Option 2 ID : 4447921593

Option 3 ID : 4447921591

Option 4 ID : 4447921592

Status : **Not Answered**

Chosen Option : --

Q.13 Let $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$, $\vec{b} = 2\hat{i} + \hat{j} - \hat{k}$, $\vec{c} = \lambda\hat{i} + \hat{j} + \hat{k}$ and $\vec{v} = \vec{a} \times \vec{b}$. If $\vec{v} \cdot \vec{c} = 11$ and the length of the projection of $\vec{b}$ on $\vec{c}$ is p , then $9p^2$ is equal to

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

Question Type : **MCQ**

Question ID : **444792465**

Option 1 ID : **4447921590**

Option 2 ID : **4447921587**

Option 3 ID : **4447921589**

Option 4 ID : **4447921588**

Status : **Not Answered**

Chosen Option : --

Q.14 Let PQ be a chord of the hyperbola $\frac{x^2}{4} - \frac{y^2}{b^2} = 1$, perpendicular to the x-axis such that OPQ is an equilateral triangle, O being the centre of the hyperbola. If the eccentricity of the hyperbola is $\sqrt{3}$, then the area of the triangle OPQ is

- Options
1. $\frac{11}{5}$
 2. $\frac{9}{5}$
 3. $\frac{8\sqrt{3}}{5}$
 4. $2\sqrt{3}$

Question Type : **MCQ**

Question ID : **444792462**

Option 1 ID : **4447921578**

Option 2 ID : **4447921577**

Option 3 ID : **4447921575**

Option 4 ID : **4447921576**

Status : **Not Answered**

Chosen Option : --

Q.15

Let $\frac{\pi}{2} < \theta < \pi$ and $\cot \theta = -\frac{1}{2\sqrt{2}}$. Then the value of

$$\sin\left(\frac{15\theta}{2}\right)(\cos 8\theta + \sin 8\theta) + \cos\left(\frac{15\theta}{2}\right)(\cos 8\theta - \sin 8\theta)$$

is equal to

Options

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

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

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

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

Question Type : MCQ

Question ID : 444792464

Option 1 ID : 4447921583

Option 2 ID : 4447921586

Option 3 ID : 4447921584

Option 4 ID : 4447921585

Status : Not Answered

Chosen Option : --

Q.16

If $z = \frac{\sqrt{3}}{2} + \frac{i}{2}$, $i = \sqrt{-1}$, then $(z^{201} - i)^8$ is equal to

Options

1. 0

2. 256

3. -1

4. 1

Question Type : MCQ

Question ID : 444792454

Option 1 ID : 4447921543

Option 2 ID : 4447921546

Option 3 ID : 4447921544

Option 4 ID : 4447921545

Status : Not Answered

Chosen Option : --

Q.17 Consider two sets $A = \{x \in \mathbb{Z} : |(|x-3|-3)| \leq 1\}$ and

$$B = \left\{ x \in \mathbb{R} - \{1, 2\} : \frac{(x-2)(x-4)}{x-1} \log_e(|x-2|) = 0 \right\}.$$

Then the number of onto functions $f: A \rightarrow B$ is equal to

- Options 1. 32
2. 62
3. 81
4. 79

Question Type : **MCQ**

Question ID : **444792452**

Option 1 ID : **4447921535**

Option 2 ID : **4447921536**

Option 3 ID : **4447921538**

Option 4 ID : **4447921537**

Status : **Not Answered**

Chosen Option : --

Q.18 Let $A(1, 2)$ and $C(-3, -6)$ be two diagonally opposite vertices of a rhombus, whose sides AD and BC are parallel to the line $7x - y = 14$. If $B(\alpha, \beta)$ and $D(\gamma, \delta)$ are the other two vertices, then $|\alpha + \beta + \gamma + \delta|$ is equal to

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

Question Type : **MCQ**

Question ID : **444792463**

Option 1 ID : **4447921581**

Option 2 ID : **4447921579**

Option 3 ID : **4447921582**

Option 4 ID : **4447921580**

Status : **Not Answered**

Chosen Option : --

Q.19 Let $\sum_{k=1}^n a_k = \alpha n^2 + \beta n$. If $a_{10} = 59$ and $a_6 = 7a_1$, then $\alpha + \beta$ is equal to

- Options 1. 3
2. 5
3. 7
4. 12

Question Type : **MCQ**

Question ID : **444792456**

Option 1 ID : **4447921551**

Option 2 ID : **4447921552**

Option 3 ID : **4447921553**

Option 4 ID : **4447921554**

Status : **Not Answered**

Chosen Option : --

Q.20 The number of ways, in which 16 oranges can be distributed to four children such that each child gets at least one orange, is

- Options 1. 403
2. 384
3. 429
4. 455

Question Type : **MCQ**
Question ID : **444792457**
Option 1 ID : **4447921556**
Option 2 ID : **4447921555**
Option 3 ID : **4447921558**
Option 4 ID : **4447921557**
Status : **Not Answered**
Chosen Option : --

Section : Mathematics Section B

Q.21 Let S denote the set of 4-digit numbers $abcd$ such that $a > b > c > d$ and P denote the set of 5-digit numbers having product of its digits equal to 20. Then $n(S) + n(P)$ is equal to ____

Given --
Answer :

Question Type : **SA**
Question ID : **444792472**
Status : **Not Answered**

Q.22 If the image of the point $P(a, 2, a)$ in the line $\frac{x}{2} = \frac{y+a}{1} = \frac{z}{1}$ is Q and the image of Q in the line $\frac{x-2b}{2} = \frac{y-a}{1} = \frac{z+2b}{-5}$ is P, then $a + b$ is equal to ____.

Given --
Answer :

Question Type : **SA**
Question ID : **444792473**
Status : **Not Answered**

Q.23 Let $A = \begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & 1 \\ 3 & -1 & 0 \end{bmatrix}$ and B be a matrix such that $B(I - A) = I + A$. Then the sum of the diagonal elements of $B^T B$ is equal to ____

Given --
Answer :

Question Type : **SA**
Question ID : **444792471**
Status : **Not Answered**

Q.24 The number of elements in the

$$\text{set } S = \left\{ x : x \in [0, 100] \text{ and } \int_0^x t^2 \sin(x-t) dt = x^2 \right\} \text{ is } \underline{\hspace{2cm}}$$

Given --
Answer :

Question Type : SA
Question ID : 444792474
Status : Not Answered

Q.25 If the solution curve $y = f(x)$ of the differential equation

$$(x^2 - 4)y' - 2xy + 2x(4 - x^2)^2 = 0, x > 2,$$

passes through the point (3, 15), then the local maximum value of f is _____

Given --
Answer :

Question Type : SA
Question ID : 444792475
Status : Not Answered

Section : Physics Section A

Q.26 A small metallic sphere of diameter 2 mm and density 10.5 g/cm^3 is dropped in glycerine having viscosity 10 Poise and density 1.5 g/cm^3 respectively. The terminal velocity attained by the sphere is _____ cm/s.

$$\left(\pi = \frac{22}{7} \text{ and } g = 10 \text{ m/s}^2\right)$$

Options 1. 1.5

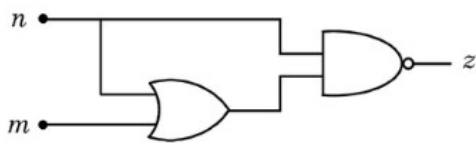
2. 2.0

3. 3.0

4. 1.0

Question Type : MCQ
Question ID : 444792481
Option 1 ID : 4447921637
Option 2 ID : 4447921638
Option 3 ID : 4447921639
Option 4 ID : 4447921636
Status : Not Answered
Chosen Option : --

Q.27 For the given logic gate circuit, which of the following is the correct truth table ?



Options

	<i>n</i>	<i>m</i>	<i>z</i>
	0	0	0
1.	0	1	1
	1	1	0
	1	0	1
	<i>n</i>	<i>m</i>	<i>z</i>
	0	0	1
2.	0	1	1
	1	1	0
	1	0	0
	<i>n</i>	<i>m</i>	<i>z</i>
	0	0	1
3.	0	1	0
	1	1	1
	1	0	0
	<i>n</i>	<i>m</i>	<i>z</i>
	0	0	1
4.	0	1	0
	1	1	0
	1	0	0

Question Type : **MCQ**

Question ID : **444792495**

Option 1 ID : **4447921695**

Option 2 ID : **4447921694**

Option 3 ID : **4447921693**

Option 4 ID : **4447921692**

Status : **Not Answered**

Chosen Option : --

Q.28 An air bubble of volume 2.9 cm^3 rises from the bottom of a swimming pool of 5 m deep. At the bottom of the pool water temperature is 17°C . The volume of the bubble when it reaches the surface, where the water temperature is 27°C , is ____ cm^3 .

($g = 10 \text{ m/s}^2$, density of water = 10^3 kg/m^3 , and 1 atm pressure is 10^5 Pa)

- Options
1. 2.0
 2. 3.0
 3. 4.5
 4. 4.2

Question Type : **MCQ**

Question ID : **444792482**

Option 1 ID : **4447921641**

Option 2 ID : **4447921642**

Option 3 ID : **4447921643**

Option 4 ID : **4447921640**

Status : **Not Answered**

Chosen Option : --

Q.29 A circular loop of radius 7 cm is placed in uniform magnetic field of 0.2 T directed perpendicular to plane of loop. The loop is converted into a square loop in 0.5 s. The EMF induced in the loop is _____ mV.

- Options
1. 13.2
 2. 8.25
 3. 6.6
 4. 1.32

Question Type : **MCQ**

Question ID : **444792490**

Option 1 ID : **4447921673**

Option 2 ID : **4447921675**

Option 3 ID : **4447921674**

Option 4 ID : **4447921672**

Status : **Answered**

Chosen Option : 4

Q.30 A body of mass 14 kg initially at rest explodes and breaks into three fragments of masses in the ratio 2 : 2 : 3. The two pieces of equal masses fly off perpendicular to each other with a speed of 18 m/s each. The velocity of the heavier fragment is ____ m/s.

- Options
1. $12\sqrt{2}$
 2. 12
 3. $10\sqrt{2}$
 4. $24\sqrt{2}$

Question Type : **MCQ**

Question ID : **444792480**

Option 1 ID : **4447921632**

Option 2 ID : **4447921634**

Option 3 ID : **4447921633**

Option 4 ID : **4447921635**

Status : **Answered**

Chosen Option : 1

Q.31 Which of the following pair of nuclei are isobars of the element?

- Options
1. $^{236}_{92}\text{U}$ and $^{238}_{92}\text{U}$
 2. ^2_1H and ^3_1H
 3. ^3_1H and ^3_2He
 4. $^{198}_{80}\text{Hg}$ and $^{197}_{79}\text{Au}$

Question Type : MCQ

Question ID : 444792494

Option 1 ID : 4447921689

Option 2 ID : 4447921688

Option 3 ID : 4447921690

Option 4 ID : 4447921691

Status : Answered

Chosen Option : 3

Q.32 The ratio of speeds of electromagnetic waves in vacuum and a medium, having dielectric constant $k = 3$ and permeability of $\mu = 2\mu_0$, is (μ_0 = permeability of vacuum)

- Options
1. $\sqrt{6} : 1$
 2. $6 : 1$
 3. $36 : 1$
 4. $3 : 2$

Question Type : MCQ

Question ID : 444792491

Option 1 ID : 4447921679

Option 2 ID : 4447921677

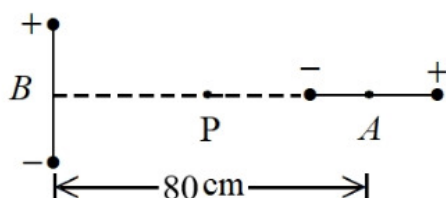
Option 3 ID : 4447921678

Option 4 ID : 4447921676

Status : Answered

Chosen Option : 1

- Q.33** Two short dipoles (A , B), A having charges $\pm 2 \mu\text{C}$ and length 1 cm and B having charges $\pm 4 \mu\text{C}$ and length 1 cm are placed with their centres 80 cm apart as shown in the figure. The electric field at a point P , equi-distant from the centres of both dipoles is _____ N/C .



- Options
1. $4.5\sqrt{2} \times 10^4$
 2. $9\sqrt{2} \times 10^4$
 3. $\frac{9}{16}\sqrt{2} \times 10^5$
 4. $\frac{9}{16}\sqrt{2} \times 10^4$

Question Type : **MCQ**

Question ID : **444792488**

Option 1 ID : **4447921667**

Option 2 ID : **4447921664**

Option 3 ID : **4447921666**

Option 4 ID : **4447921665**

Status : **Not Answered**

Chosen Option : --

- Q.34** The internal energy of a monoatomic gas is $3nRT$. One mole of helium is kept in a cylinder having internal cross section area of 17 cm^2 and fitted with a light movable frictionless piston. The gas is heated slowly by supplying 126 J heat. If the temperature rises by 4°C , then the piston will move _____ cm .
(atmospheric pressure = 10^5 Pa)

- Options
1. **15.5**
 2. 1.55
 3. 1.45
 4. 14.5

Question Type : **MCQ**

Question ID : **444792484**

Option 1 ID : **4447921648**

Option 2 ID : **4447921650**

Option 3 ID : **4447921651**

Option 4 ID : **4447921649**

Status : **Not Answered**

Chosen Option : --

Q.35 To compare EMF of two cells using potentiometer the balancing lengths obtained are 200 cm and 150 cm. The least count of scale is 1 cm. The percentage error in the ratio of EMFs is _____

- Options 1. 1.65
2. 1.55
3. 1.45
4. 1.75

Question Type : **MCQ**

Question ID : **444792476**

Option 1 ID : **4447921618**

Option 2 ID : **4447921617**

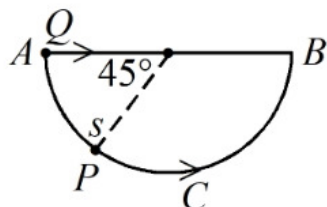
Option 3 ID : **4447921616**

Option 4 ID : **4447921619**

Status : **Not Answered**

Chosen Option : --

Q.36 A bead P sliding on a frictionless semi-circular string (ACB) and it is at point S at $t = 0$ and at this instant the horizontal component of its velocity is v . Another bead Q of the same mass as P is ejected from point A at $t = 0$ along the horizontal string AB , with the speed v , friction between the beads and the respective strings may be neglected in both cases. Let t_P and t_Q be the respective times taken by beads P and Q to reach the point B , then the relation between t_P and t_Q is



- Options 1. $t_P > t_Q$
2. $t_P > 1.25t_Q$
3. $t_P = t_Q$
4. $t_P < t_Q$

Question Type : **MCQ**

Question ID : **444792478**

Option 1 ID : **4447921625**

Option 2 ID : **4447921627**

Option 3 ID : **4447921626**

Option 4 ID : **4447921624**

Status : **Not Answered**

Chosen Option : --

Q.37 A parallel plate capacitor with plate separation 5 mm is charged by a battery. On introducing a mica sheet of 2 mm and maintaining the connections of the plates with the terminals of the battery, it is found that it draws 25% more charge from the battery. The dielectric constant of mica is _____.

- Options 1. 2.0
2. 1.0
3. 1.5
4. 2.5

Question Type : **MCQ**
Question ID : **444792485**
Option 1 ID : **4447921655**
Option 2 ID : **4447921653**
Option 3 ID : **4447921654**
Option 4 ID : **4447921652**
Status : **Answered**
Chosen Option : 1

Q.38 One mole of an ideal diatomic gas expands from volume V to $2V$ isothermally at a temperature 27°C and does W joule of work. If the gas undergoes same magnitude of expansion adiabatically from 27°C doing the same amount of work W , then its final temperature will be (close to) _____ $^\circ\text{C}$.
($\log_e 2 = 0.693$)

- Options 1. -56
2. -30
3. -189
4. -117

Question Type : **MCQ**
Question ID : **444792483**
Option 1 ID : **4447921645**
Option 2 ID : **4447921646**
Option 3 ID : **4447921647**
Option 4 ID : **4447921644**
Status : **Not Answered**
Chosen Option : --

Q.39 A block is sliding down on an inclined plane of slope θ and at an instant $t = 0$ this block is given an upward momentum so that it starts moving up on the inclined surface with velocity u . The distance (S) travelled by the block before its velocity become zero, is _____.
(g = gravitational acceleration)

Options

1. $\frac{u^2}{2g \cos \theta}$
2. $\frac{u^2}{\sqrt{2}g \cos \theta}$
3. $\frac{u^2}{4g \sin \theta}$
4. $\frac{2u^2}{g \cos \theta}$

Question Type : **MCQ**

Question ID : **444792479**

Option 1 ID : **4447921629**

Option 2 ID : **4447921631**

Option 3 ID : **4447921628**

Option 4 ID : **4447921630**

Status : **Not Answered**

Chosen Option : --

Q.40 A paratrooper jumps from an aeroplane and opens a parachute after 2 s of free fall and starts deaccelerating with 3 m/s^2 . At 10 m height from ground, while descending with the help of parachute, the speed of paratrooper is 5 m/s. The initial height of the airplane is _____m.
($g = 10 \text{ m/s}^2$)

Options

1. 82.5
2. 92.5
3. 62.5
4. 20

Question Type : **MCQ**

Question ID : **444792477**

Option 1 ID : **4447921620**

Option 2 ID : **4447921622**

Option 3 ID : **4447921621**

Option 4 ID : **4447921623**

Status : **Not Answered**

Chosen Option : --

Q.41 Two charges $7 \mu\text{C}$ and $-2 \mu\text{C}$ are placed at $(-9, 0, 0) \text{ cm}$ and $(9, 0, 0) \text{ cm}$ respectively in an external field $E = \frac{A}{r^2} \hat{r}$, where $A = 9 \times 10^5 \text{ N/C.m}^2$.

Considering the potential at infinity is 0, the electrostatic energy of the configuration is _____ J.

- Options 1. 24.3
2. 49.3
3. -90.7
4. 1.4

Question Type : **MCQ**
Question ID : **444792489**
Option 1 ID : **4447921671**
Option 2 ID : **4447921670**
Option 3 ID : **4447921668**
Option 4 ID : **4447921669**
Status : **Not Answered**
Chosen Option : --

Q.42 Suppose a long solenoid of 100 cm length, radius 2 cm having 500 turns per unit length, carries a current $I = 10 \sin(\omega t) \text{ A}$, where $\omega = 1000 \text{ rad./s}$. A circular conducting loop (B) of radius 1 cm coaxially slid through the solenoid at a speed $v = 1 \text{ cm/s}$. The r.m.s. current through the loop when the coil B is inserted 10 cm inside the solenoid is $\alpha / \sqrt{2} \mu\text{A}$. The value of α is _____.
[Resistance of the loop = 10Ω]

- Options 1. 197
2. 100
3. 80
4. 280

Question Type : **MCQ**
Question ID : **444792486**
Option 1 ID : **4447921658**
Option 2 ID : **4447921656**
Option 3 ID : **4447921659**
Option 4 ID : **4447921657**
Status : **Not Answered**
Chosen Option : --

Q.43 The current passing through a conducting loop in the form of equilateral triangle of side $4\sqrt{3}$ cm is 2 A. The magnetic field at its centroid is $\alpha \times 10^{-5}$ T. The value of α is _____.
(Given : $\mu_0 = 4\pi \times 10^{-7}$ SI units)

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

Question Type : **MCQ**

Question ID : **444792487**

Option 1 ID : **4447921662**

Option 2 ID : **4447921661**

Option 3 ID : **4447921660**

Option 4 ID : **4447921663**

Status : **Answered**

Chosen Option : **3**

Q.44 When an unpolarized light falls at a particular angle on a glass plate (placed in air), it is observed that the reflected beam is linearly polarized. The angle of refracted beam with respect to the normal is _____.

($\tan^{-1}(1.52) = 57.7^\circ$, refractive indices of air and glass are 1.00 and 1.52, respectively.)

- Options
1. 39.6°
 2. 32.3°
 3. 42.6°
 4. 36.3°

Question Type : **MCQ**

Question ID : **444792492**

Option 1 ID : **4447921682**

Option 2 ID : **4447921680**

Option 3 ID : **4447921683**

Option 4 ID : **4447921681**

Status : **Answered**

Chosen Option : **2**

- Q.45** A prism of angle 75° and refractive index $\sqrt{3}$ is coated with thin film of refractive index 1.5 only at the back exit surface. To have total internal reflection at the back exit surface the incident angle must be _____.
($\sin 15^\circ = 0.25$ and $\sin 25^\circ = 0.43$)

Options 1. $> 25^\circ$

2. 15°

3. between 15° and 20°

4. $< 15^\circ$

Question Type : MCQ

Question ID : 444792493

Option 1 ID : 4447921685

Option 2 ID : 4447921684

Option 3 ID : 4447921686

Option 4 ID : 4447921687

Status : Not Answered

Chosen Option : --

Section : Physics Section B

- Q.46** The average energy released per fission for the nucleus of ${}_{92}^{235}\text{U}$ is 190 MeV. When all the atoms of 47 g pure ${}_{92}^{235}\text{U}$ undergo fission process, the energy released is $\alpha \times 10^{23}$ MeV. The value of α is _____.

(Avogadro Number = 6×10^{23} per mole)

Given 228

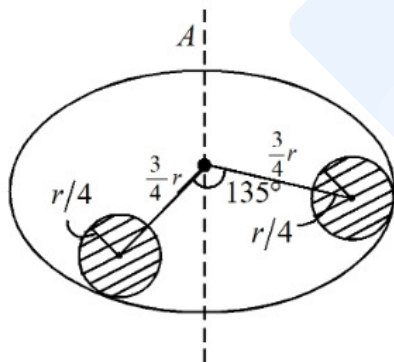
Answer :

Question Type : SA

Question ID : 444792500

Status : Answered

- Q.47** Suppose there is a uniform circular disc of mass M kg and radius r m shown in figure. The shaded regions are cut out from the disc. The moment of inertia of the remainder about the axis A of the disc is given by $\frac{x}{256} Mr^2$. The value of x is _____.



Given 236

Answer :

Question Type : SA

Question ID : 444792496

Status : Answered

Q.48 A ball of radius r and density ρ dropped through a viscous liquid of density σ and viscosity η attains its terminal velocity at time t , given by $t = A \rho^a r^b \eta^c \sigma^d$, where A is a constant and a, b, c and d are integers. The value of $\frac{b+c}{a+d}$ is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **444792497**
Status : **Not Answered**

Q.49 The velocity of sound in air is doubled when the temperature is raised from 0°C to $\alpha^\circ\text{C}$. The value of α is _____.

Given --
Answer :

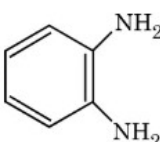
Question Type : **SA**
Question ID : **444792498**
Status : **Not Answered**

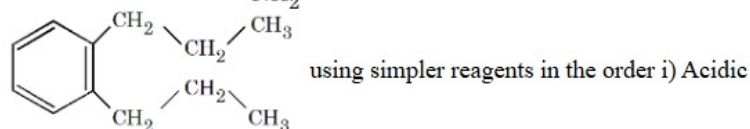
Q.50 The size of the images of an object, formed by a thin lens are equal when the object is placed at two different positions 8 cm and 24 cm from the lens. The focal length of the lens is _____ cm.

Given **8**
Answer :

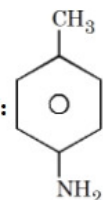
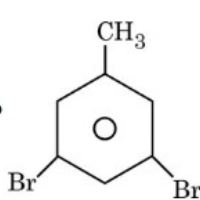
Question Type : **SA**
Question ID : **444792499**
Status : **Answered**

Given below are two statements:

Statement I:  can be synthesized from



KMnO₄, ii) Ammonia, iii) Bromine and alkali

Statement II:  can be converted into  using reagents

in the order i) Bromine-H₂O ii) NaNO₂/HCl (0 - 5 °C) (iii) Aq. H₃PO₂ .

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

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

Question Type : **MCQ**

Question ID : **444792517**

Option 1 ID : **4447921768**

Option 2 ID : **4447921766**

Option 3 ID : **4447921767**

Option 4 ID : **4447921765**

Status : **Not Answered**

Chosen Option : --

Q.52 In Carius method 0.2425 g of an organic compound gave 0.5253 g silver chloride.
The percentage of chlorine in the organic compound is

- Options
1. 37.57%
 2. 34.79%
 3. 53.58%
 4. 87.65%

Question Type : **MCQ**

Question ID : **444792512**

Option 1 ID : **4447921745**

Option 2 ID : **4447921746**

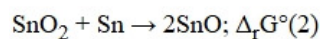
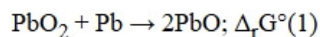
Option 3 ID : **4447921747**

Option 4 ID : **4447921748**

Status : **Not Answered**

Chosen Option : --

Q.53 It is noticed that Pb^{2+} is more stable than Pb^{4+} but Sn^{2+} is less stable than Sn^{4+} . Observe the following reactions.



Identify the correct set from the following

- Options
1. $\Delta_r G^\circ(1) > 0$; $\Delta_r G^\circ(2) < 0$
 2. $\Delta_r G^\circ(1) < 0$; $\Delta_r G^\circ(2) > 0$
 3. $\Delta_r G^\circ(1) > 0$; $\Delta_r G^\circ(2) > 0$
 4. $\Delta_r G^\circ(1) < 0$; $\Delta_r G^\circ(2) < 0$

Question Type : **MCQ**

Question ID : **444792504**

Option 1 ID : **4447921716**

Option 2 ID : **4447921713**

Option 3 ID : **4447921715**

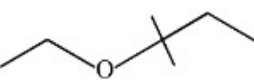
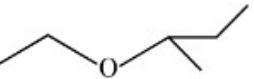
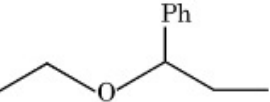
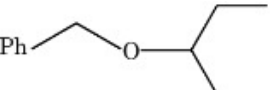
Option 4 ID : **4447921714**

Status : **Answered**

Chosen Option : **4**

Q.54 A mixed ether (P), when heated with excess of hot concentrated hydrogen iodide produces two different alkyl iodides which when treated with aq. NaOH give compounds (Q) and (R). Both (Q) and (R) give yellow precipitate with NaOI. Identify the mixed ether (P):

Options

1. 
2. 
3. 
4. 

Question Type : **MCQ**

Question ID : **444792516**

Option 1 ID : **4447921761**

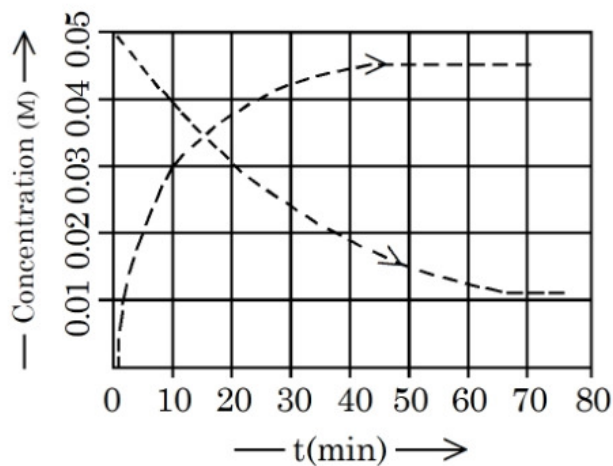
Option 2 ID : **4447921763**

Option 3 ID : **4447921764**

Option 4 ID : **4447921762**

Status : **Not Answered**

Chosen Option : **--**



Given above is the concentration vs time plot for a dissociation reaction : $A \rightarrow nB$.

Based on the data of the initial phase of the reaction (initial 10 min), the value of n is _____.

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

Question Type : MCQ

Question ID : 444792506

Option 1 ID : 4447921721

Option 2 ID : 4447921722

Option 3 ID : 4447921724

Option 4 ID : 4447921723

Status : Answered

Chosen Option : 4

Q.56 The work functions of two metals (M_A and M_B) are in the 1 : 2 ratio. When these metals are exposed to photons of energy 6 eV, the kinetic energy of liberated electrons of $M_A : M_B$ is in the ratio of 2.642 : 1. The work functions (in eV) of M_A and M_B are respectively.

- Options 1. 2.3, 4.6
2. 3.1, 6.2
3. 1.4, 2.8
4. 1.5, 3.0

Question Type : MCQ

Question ID : 444792501

Option 1 ID : 4447921701

Option 2 ID : 4447921702

Option 3 ID : 4447921704

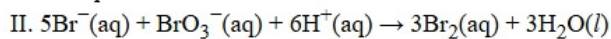
Option 4 ID : 4447921703

Status : Answered

Chosen Option : 1

Q.57 Observe the following reactions at T(K).

I. $A \rightarrow \text{products}$.



Both the reactions are started at 10.00 am. The rates of these reactions at 10.10 am are same. The value of $-\frac{\Delta[\text{Br}^-]}{\Delta t}$ at 10.10 am is $2 \times 10^{-4} \text{ mol L}^{-1} \text{ min}^{-1}$. The concentration of A at 10.10 am is $10^{-2} \text{ mol L}^{-1}$. What is the first order rate constant (in min^{-1}) of reaction I?

- Options
1. 2×10^{-3}
 2. 4×10^{-3}
 3. 10^{-2}
 4. 10^{-3}

Question Type : **MCQ**

Question ID : **444792507**

Option 1 ID : **4447921726**

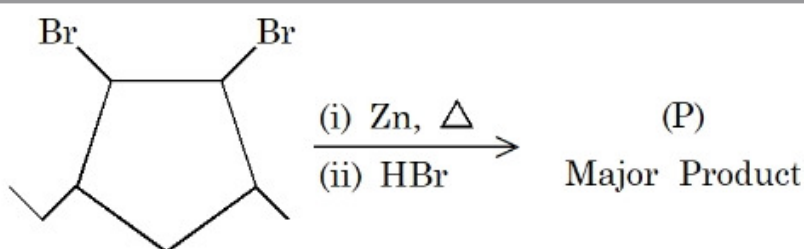
Option 2 ID : **4447921725**

Option 3 ID : **4447921727**

Option 4 ID : **4447921728**

Status : **Answered**

Chosen Option : **2**



Identify (P)

Options

- 1.
- 2.
- 3.
- 4.

Question Type : **MCQ**

Question ID : **444792514**

Option 1 ID : **4447921754**

Option 2 ID : **4447921753**

Option 3 ID : **4447921755**

Option 4 ID : **4447921756**

Status : **Not Answered**

Chosen Option : --

Q.59 Given below are two statements:

Statement I: $(\text{CH}_3)_3\text{C}^\oplus$ is more stable than $\text{CH}_3^\oplus$ as nine hyperconjugation

interactions are possible in $(\text{CH}_3)_3\text{C}^\oplus$.

Statement II: $\text{CH}_3^\oplus$ is less stable than $(\text{CH}_3)_3\text{C}^\oplus$ as only three hyperconjugation

interactions are possible in $\text{CH}_3^\oplus$.

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

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

Question Type : MCQ

Question ID : 444792513

Option 1 ID : 4447921749

Option 2 ID : 4447921750

Option 3 ID : 4447921752

Option 4 ID : 4447921751

Status : Answered

Chosen Option : 4

Q.60 Which statements are **NOT TRUE** about XeO_2F_2 ?

- A. It has a see-saw shape.
- B. Xe has 5 electron pairs in its valence shell in XeO_2F_2 .
- C. The O-Xe-O bond angle is close to 180° .
- D. The F-Xe-F bond angle is close to 180° .
- E. Xe has 16 valence electrons in XeO_2F_2 .

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

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

Question Type : MCQ

Question ID : 444792503

Option 1 ID : 4447921710

Option 2 ID : 4447921709

Option 3 ID : 4447921711

Option 4 ID : 4447921712

Status : Answered

Chosen Option : 2

Q.61 Identify the INCORRECT statements from the following:

- A. Notation ${}^{24}_{12}\text{Mg}$ represents 24 protons and 12 neutrons.
- B. Wavelength of a radiation of frequency $4.5 \times 10^{15} \text{ s}^{-1}$ is $6.7 \times 10^{-8} \text{ m}$.
- C. One radiation has wavelength = λ_1 (900 nm) and energy = E_1 . Other radiation has wavelength = λ_2 (300 nm) and energy = E_2 . $E_1 : E_2 = 3 : 1$.
- D. Number of photons of light of wavelength 2000 pm that provides 1 J of energy is 1.006×10^{16} .

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

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

Question Type : MCQ

Question ID : 444792502

Option 1 ID : 4447921707

Option 2 ID : 4447921706

Option 3 ID : 4447921705

Option 4 ID : 4447921708

Status : Not Answered

Chosen Option : --

Q.62 Both human DNA and RNA are chiral molecules. The chirality in DNA and RNA arises due to the presence of

- Options
- 1. Base unit
 - 2. Chiral phosphate unit
 - 3. L-sugar component
 - 4. D-sugar component

Question Type : MCQ

Question ID : 444792519

Option 1 ID : 4447921775

Option 2 ID : 4447921776

Option 3 ID : 4447921774

Option 4 ID : 4447921773

Status : Not Answered

Chosen Option : --

Q.63 The oxidation state of chromium in the final product formed in the reaction between KI and acidified $K_2Cr_2O_7$ solution is:

- Options
1. +3
 2. +6
 3. +2
 4. +4

Question Type : MCQ

Question ID : 444792510

Option 1 ID : 4447921740

Option 2 ID : 4447921738

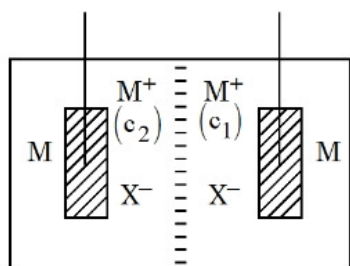
Option 3 ID : 4447921739

Option 4 ID : 4447921737

Status : Not Answered

Chosen Option : --

Q.64



Semi permeable membrane

Consider the above electrochemical cell where a metal electrode (M) is undergoing redox reaction by forming M^+ ($M \rightarrow M^+ + e^-$). The cation M^+ is present in two different concentrations c_1 and c_2 as shown above. Which of the following statement is correct for generating a positive cell potential?

- Options
1. If c_1 is present at anode, then $c_1 > c_2$.
 2. If c_1 is present at cathode, then $c_1 > c_2$.
 3. If c_1 is present at anode, then $c_1 = c_2$.
 4. If c_1 is present at cathode, then $c_1 < c_2$.

Question Type : MCQ

Question ID : 444792505

Option 1 ID : 4447921718

Option 2 ID : 4447921719

Option 3 ID : 4447921720

Option 4 ID : 4447921717

Status : Not Answered

Chosen Option : --

Q.65 A student has been given a compound "x" of molecular formula- C_6H_7N . 'x' is sparingly soluble in water. However, on addition of dilute mineral acid, 'x' becomes soluble in water. 'x' when treated with $CHCl_3$ and $KOH(alc)$, 'y' is produced. 'y' has a specific unpleasant smell. On treatment with benzenesulphonyl chloride, 'x' gives a compound 'z' which is soluble in alkali. The number of different "H" atoms present in 'z' is:-

- Options 1. 5
2. 4
3. 8
4. 7

Question Type : MCQ

Question ID : 444792518

Option 1 ID : 4447921769

Option 2 ID : 4447921770

Option 3 ID : 4447921772

Option 4 ID : 4447921771

Status : Not Answered

Chosen Option : --

Q.66 Which of the following statements are **TRUE** about Haloform reaction?:

- A. Sodium hypochlorite reacts with KI to give KOI.
B. KOI is a reducing agent.

C. α, β -unsaturated methylketone $(CH_3 - CH = CH - \overset{\overset{O}{||}}{C} - CH_3)$ will give

iodoform reaction.

- D. Isopropyl alcohol will not give iodoform test.
E. Methanoic acid will give positive iodoform test.

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

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

Question Type : MCQ

Question ID : 444792515

Option 1 ID : 4447921757

Option 2 ID : 4447921759

Option 3 ID : 4447921760

Option 4 ID : 4447921758

Status : Not Answered

Chosen Option : --

Q.67 Elements X and Y belong to Group 15. The difference between the electronegativity values of 'X' and phosphorus is higher than that of the difference between phosphorus and 'Y'. 'X' & 'Y' are respectively

- Options
1. As & Bi
 2. Bi & N
 3. As & Sb
 4. N & As

Question Type : MCQ

Question ID : 444792509

Option 1 ID : 4447921734

Option 2 ID : 4447921733

Option 3 ID : 4447921736

Option 4 ID : 4447921735

Status : Not Answered

Chosen Option : --

Q.68 Iodoform test can differentiate between

- A. Methanol and Ethanol
- B. CH_3COOH and $\text{CH}_3\text{CH}_2\text{COOH}$
- C. Cyclohexene and cyclohexanone
- D. Diethyl ether and Pentan-3-one
- E. Anisole and acetone

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

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

Question Type : MCQ

Question ID : 444792520

Option 1 ID : 4447921778

Option 2 ID : 4447921777

Option 3 ID : 4447921779

Option 4 ID : 4447921780

Status : Not Answered

Chosen Option : --

Q.69 Identify the **CORRECT** set of details from the following:

- A. $[\text{Co}(\text{NH}_3)_6]^{3+}$: Inner orbital complex; d^2sp^3 hybridized
- B. $[\text{MnCl}_6]^{3-}$: Outer orbital complex; sp^3d^2 hybridized
- C. $[\text{CoF}_6]^{3-}$: Outer orbital complex; d^2sp^3 hybridized
- D. $[\text{FeF}_6]^{3-}$: Outer orbital complex; sp^3d^2 hybridized
- E. $[\text{Ni}(\text{CN})_4]^{2-}$: Inner orbital complex; sp^3 hybridized

Choose the correct answer from the options given below:

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

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

Question Type : MCQ

Question ID : 444792511

Option 1 ID : 4447921741

Option 2 ID : 4447921744

Option 3 ID : 4447921742

Option 4 ID : 4447921743

Status : Answered

Chosen Option : 3

Q.70 Given below are two statements:

Statement I: The second ionisation enthalpy of Na is larger than the corresponding ionisation enthalpy of Mg.

Statement II: The ionic radius of O^{2-} is larger than that of F^- .

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

Question Type : MCQ

Question ID : 444792508

Option 1 ID : 4447921731

Option 2 ID : 4447921732

Option 3 ID : 4447921729

Option 4 ID : 4447921730

Status : Answered

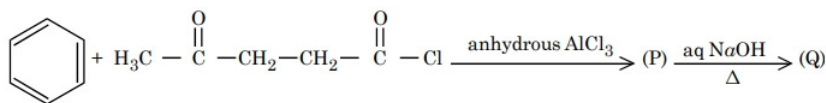
Chosen Option : 3

Q.71 Total number of unpaired electrons present in the central metal atoms/ions of $[\text{Ni}(\text{CO})_4]$, $[\text{NiCl}_4]^{2-}$, $[\text{PtCl}_2(\text{NH}_3)_2]$, $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{Pt}(\text{CN})_4]^{2-}$ is _____.

Given 10
Answer :

Question Type : SA
Question ID : 444792521
Status : Answered

Q.72 Consider the following reaction of benzene.



In compound (Q), the percentage of oxygen is _____. (Nearest integer)

Given --
Answer :

Question Type : SA
Question ID : 444792522
Status : Not Answered

Q.73 200 cc of $x \times 10^{-3}$ M potassium dichromate is required to oxidise 750 cc of 0.6 M Mohr's salt solution in acidic medium.

Here $x =$ _____.

Given --
Answer :

Question Type : SA
Question ID : 444792523
Status : Not Answered

Q.74 Two liquids A and B form an ideal solution. At 320 K, the vapour pressure of the solution, containing 3 mol of A and 1 mol of B is 500 mm Hg. At the same temperature, if 1 mol of A is further added to this solution, vapour pressure of the solution increases by 20 mm Hg. Vapour pressure (in mm Hg) of B in pure state is _____. (Nearest integer)

Given --
Answer :

Question Type : SA
Question ID : 444792525
Status : Not Answered

Q.75 $X_2(g) + Y_2(g) \rightleftharpoons 2Z(g)$

$X_2(g)$ and $Y_2(g)$ are added to a 1 L flask and it is found that the system attains the above equilibrium at T(K) with the number of moles of $X_2(g)$, $Y_2(g)$ and $Z(g)$ being 3, 3 and 9 mol respectively (equilibrium moles). Under this condition of equilibrium, 10 mol of $Z(g)$ is added to the flask and the temperature is maintained at T(K). Then the number of moles of $Z(g)$ in the flask when the new equilibrium is established is _____. (Nearest integer)

Given --

Answer :

Question Type : SA

Question ID : 444792524

Status : Not Answered