

NTA JEE 2024_27 29 30 31 Jan 1st Feb 2024

Application No	
Candidate Name	
Roll No.	
Test Date	30/01/2024
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 Let S_n denote the sum of first n terms of an arithmetic progression. If $S_{20} = 790$ and $S_{10} = 145$, then $S_{15} - S_5$ is :

- Options
1. 405
 2. 410
 3. 390
 4. 395

Question Type : **MCQ**

Question ID : 533543832

Option 1 ID : 5335432731

Option 2 ID : 5335432734

Option 3 ID : 5335432733

Option 4 ID : 5335432732

Status : **Answered**

Chosen Option : 4

Q.2 The maximum area of a triangle whose one vertex is at $(0, 0)$ and the other two vertices lie on the curve $y = -2x^2 + 54$ at points (x, y) and $(-x, y)$, where $y > 0$, is :

- Options
1. 108
 2. 88
 3. 122
 4. 92

Question Type : **MCQ**

Question ID : 533543833

Option 1 ID : 5335432736

Option 2 ID : 5335432737

Option 3 ID : 5335432738

Option 4 ID : 5335432735

Status : **Answered**

Chosen Option : 1

Q.3 Let $y=y(x)$ be the solution of the differential equation $\sec x \, dy + \{2(1-x)\tan x + x(2-x)\} \, dx = 0$ such that $y(0)=2$. Then $y(2)$ is equal to :

Options

1. $2\{1 - \sin(2)\}$
2. $2\{\sin(2) + 1\}$
3. 1
4. 2

Question Type : **MCQ**

Question ID : **533543838**

Option 1 ID : **5335432758**

Option 2 ID : **5335432757**

Option 3 ID : **5335432755**

Option 4 ID : **5335432756**

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

Chosen Option : --

Q.4 Let (α, β, γ) be the foot of perpendicular from the point $(1, 2, 3)$ on the line $\frac{x+3}{5} = \frac{y-1}{2} = \frac{z+4}{3}$. Then $19(\alpha + \beta + \gamma)$ is equal to :

Options

1. 100
2. 102
3. 99
4. 101

Question Type : **MCQ**

Question ID : **533543842**

Option 1 ID : **5335432772**

Option 2 ID : **5335432774**

Option 3 ID : **5335432771**

Option 4 ID : **5335432773**

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

Chosen Option : --

Q.5

Let $f: \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \rightarrow \mathbf{R}$ be a differentiable function such that $f(0) = \frac{1}{2}$. If the $\lim_{x \rightarrow 0} \frac{x \int_0^x f(t) dt}{e^{x^2} - 1} = \alpha$,

then $8\alpha^2$ is equal to :

Options

1. 2
2. 1
3. 16
4. 4

Question Type : MCQ

Question ID : 533543834

Option 1 ID : 5335432740

Option 2 ID : 5335432739

Option 3 ID : 5335432742

Option 4 ID : 5335432741

Status : Answered

Chosen Option : 1

Q.6

If the domain of the function $f(x) = \cos^{-1} \left(\frac{2 - |x|}{4} \right) + \{\log_e (3 - x)\}^{-1}$ is $[-\alpha, \beta) - \{\gamma\}$, then

$\alpha + \beta + \gamma$ is equal to :

Options

1. 11
2. 9
3. 12
4. 8

Question Type : MCQ

Question ID : 533543827

Option 1 ID : 5335432713

Option 2 ID : 5335432712

Option 3 ID : 5335432714

Option 4 ID : 5335432711

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.7

Let $g : \mathbf{R} \rightarrow \mathbf{R}$ be a non constant twice differentiable function such that $g\left(\frac{1}{2}\right) = g\left(\frac{3}{2}\right)$. If a real

valued function f is defined as $f(x) = \frac{1}{2}[g(x) + g(2-x)]$, then

Options

1. $f'\left(\frac{3}{2}\right) + f'\left(\frac{1}{2}\right) = 1$
2. $f''(x) = 0$ for no x in $(0, 1)$
3. $f''(x) = 0$ for exactly one x in $(0, 1)$
4. $f''(x) = 0$ for atleast two x in $(0, 2)$

Question Type : MCQ

Question ID : 533543835

Option 1 ID : 5335432746

Option 2 ID : 5335432745

Option 3 ID : 5335432744

Option 4 ID : 5335432743

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.8

The value of $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{n^3}{(n^2 + k^2)(n^2 + 3k^2)}$ is :

Options

1. $\frac{13\pi}{8(4\sqrt{3} + 3)}$
2. $\frac{13(2\sqrt{3} - 3)\pi}{8}$
3. $\frac{(2\sqrt{3} + 3)\pi}{24}$
4. $\frac{\pi}{8(2\sqrt{3} + 3)}$

Question Type : MCQ

Question ID : 533543836

Option 1 ID : 5335432750

Option 2 ID : 5335432747

Option 3 ID : 5335432748

Option 4 ID : 5335432749

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.9

$$\text{If } f(x) = \begin{vmatrix} 2\cos^4 x & 2\sin^4 x & 3 + \sin^2 2x \\ 3 + 2\cos^4 x & 2\sin^4 x & \sin^2 2x \\ 2\cos^4 x & 3 + 2\sin^4 x & \sin^2 2x \end{vmatrix},$$

then $\frac{1}{5} f'(0) =$ is equal to :

Options

1. 6
2. 1
3. 2
4. 0

Question Type : **MCQ**Question ID : **533543830**Option 1 ID : **5335432726**Option 2 ID : **5335432724**Option 3 ID : **5335432725**Option 4 ID : **5335432723**Status : **Answered**Chosen Option : **4**

Q.10

A line passing through the point A(9, 0) makes an angle of 30° with the positive direction of x-axis. If this line is rotated about A through an angle of 15° in the clockwise direction, then its equation in the new position is :

Options

1. $\frac{y}{\sqrt{3} + 2} + x = 9$
2. $\frac{x}{\sqrt{3} + 2} + y = 9$
3. $\frac{x}{\sqrt{3} - 2} + y = 9$
4. $\frac{y}{\sqrt{3} - 2} + x = 9$

Question Type : **MCQ**Question ID : **533543839**Option 1 ID : **5335432761**Option 2 ID : **5335432762**Option 3 ID : **5335432760**Option 4 ID : **5335432759**Status : **Not Answered**Chosen Option : **--**

Q.11 If the length of the minor axis of an ellipse is equal to half of the distance between the foci, then the eccentricity of the ellipse is :

Options

1. $\frac{2}{\sqrt{5}}$

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

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

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

Question Type : **MCQ**

Question ID : **533543841**

Option 1 ID : **5335432767**

Option 2 ID : **5335432769**

Option 3 ID : **5335432768**

Option 4 ID : **5335432770**

Status : **Answered**

Chosen Option : 1

Q.12 Let $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$ and $\vec{b} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$ be two vectors such that $|\vec{a}| = 1$, $\vec{a} \cdot \vec{b} = 2$ and $|\vec{b}| = 4$. If $\vec{c} = 2(\vec{a} \times \vec{b}) - 3\vec{b}$, then the angle between \vec{b} and \vec{c} is equal to :

Options

1. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

2. $\cos^{-1}\left(-\frac{1}{\sqrt{3}}\right)$

3. $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

4. $\cos^{-1}\left(\frac{2}{3}\right)$

Question Type : **MCQ**

Question ID : **533543844**

Option 1 ID : **5335432779**

Option 2 ID : **5335432782**

Option 3 ID : **5335432780**

Option 4 ID : **5335432781**

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

Chosen Option : --

Q.13 If the circles $(x+1)^2 + (y+2)^2 = r^2$ and $x^2 + y^2 - 4x - 4y + 4 = 0$ intersect at exactly two distinct points, then

Options

1. $5 < r < 9$
2. $\frac{1}{2} < r < 7$
3. $0 < r < 7$
4. $3 < r < 7$

Question Type : **MCQ**

Question ID : **533543840**

Option 1 ID : **5335432766**

Option 2 ID : **5335432763**

Option 3 ID : **5335432764**

Option 4 ID : **5335432765**

Status : **Answered**

Chosen Option : **4**

Q.14 Consider the system of linear equations $x + y + z = 4\mu$, $x + 2y + 2\lambda z = 10\mu$, $x + 3y + 4\lambda^2 z = \mu^2 + 15$, where $\lambda, \mu \in \mathbf{R}$. Which one of the following statements is **NOT** correct ?

Options

1. The system is consistent if $\lambda \neq \frac{1}{2}$
2. The system has unique solution if $\lambda \neq \frac{1}{2}$ and $\mu \neq 1, 15$
3. The system has infinite number of solutions if $\lambda = \frac{1}{2}$ and $\mu = 15$
4. The system is inconsistent if $\lambda = \frac{1}{2}$ and $\mu \neq 1$

Question Type : **MCQ**

Question ID : **533543829**

Option 1 ID : **5335432719**

Option 2 ID : **5335432721**

Option 3 ID : **5335432722**

Option 4 ID : **5335432720**

Status : **Answered**

Chosen Option : **2**

Q.15

If $z = x + iy$, $xy \neq 0$, satisfies the equation $z^2 + i\bar{z} = 0$, then $|z^2|$ is equal to :

Options

1. 9
2. 1
3. $\frac{1}{4}$
4. 4

Question Type : **MCQ**Question ID : **533543828**Option 1 ID : **5335432718**Option 2 ID : **5335432716**Option 3 ID : **5335432715**Option 4 ID : **5335432717**Status : **Not Attempted and
Marked For Review**

Chosen Option : --

Q.16

If $2\sin^3x + \sin 2x \cos x + 4\sin x - 4 = 0$ has exactly 3 solutions in the interval $\left[0, \frac{n\pi}{2}\right]$, $n \in \mathbb{N}$, then the roots of the equation $x^2 + nx + (n-3) = 0$ belong to :

Options

1. $\left(-\frac{\sqrt{17}}{2}, \frac{\sqrt{17}}{2}\right)$
2. \mathbb{Z}
3. $(0, \infty)$
4. $(-\infty, 0)$

Question Type : **MCQ**Question ID : **533543846**Option 1 ID : **5335432790**Option 2 ID : **5335432787**Option 3 ID : **5335432788**Option 4 ID : **5335432789**Status : **Not Answered**

Chosen Option : --

Q.17 The area (in square units) of the region bounded by the parabola $y^2 = 4(x - 2)$ and the line $y = 2x - 8$, is :

Options

1. 7
2. 6
3. 9
4. 8

Question Type : **MCQ**

Question ID : **533543837**

Option 1 ID : **5335432752**

Option 2 ID : **5335432751**

Option 3 ID : **5335432754**

Option 4 ID : **5335432753**

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

Chosen Option : --

Q.18 Two integers x and y are chosen with replacement from the set $\{0, 1, 2, 3, \dots, 10\}$. Then the probability that $|x - y| > 5$, is :

Options

1. $\frac{30}{121}$
2. $\frac{60}{121}$
3. $\frac{62}{121}$
4. $\frac{31}{121}$

Question Type : **MCQ**

Question ID : **533543831**

Option 1 ID : **5335432728**

Option 2 ID : **5335432727**

Option 3 ID : **5335432729**

Option 4 ID : **5335432730**

Status : **Not Answered**

Chosen Option : --

Q.19

Let M denote the median of the following frequency distribution

Class	0 – 4	4 – 8	8 – 12	12 – 16	16 – 20
Frequency	3	9	10	8	6

Then $20M$ is equal to :

Options

1. 104
2. 52
3. 416
4. 208

Question Type : **MCQ**Question ID : **533543845**Option 1 ID : **5335432784**Option 2 ID : **5335432783**Option 3 ID : **5335432786**Option 4 ID : **5335432785**Status : **Not Attempted and
Marked For Review**

Chosen Option : --

Q.20

Let A(2, 3, 5) and C(-3, 4, -2) be opposite vertices of a parallelogram ABCD. If the diagonal

$\vec{BD} = \hat{i} + 2\hat{j} + 3\hat{k}$, then the area of the parallelogram is equal to :

Options

1. $\frac{1}{2}\sqrt{306}$
2. $\frac{1}{2}\sqrt{474}$
3. $\frac{1}{2}\sqrt{410}$
4. $\frac{1}{2}\sqrt{586}$

Question Type : **MCQ**Question ID : **533543843**Option 1 ID : **5335432776**Option 2 ID : **5335432775**Option 3 ID : **5335432777**Option 4 ID : **5335432778**Status : **Not Attempted and
Marked For Review**

Chosen Option : --

Section : **Mathematics Section B**

Q.21 If the function

$$f(x) = \begin{cases} \frac{1}{|x|} & , |x| \geq 2 \\ ax^2 + 2b & , |x| < 2 \end{cases}$$

is differentiable on \mathbf{R} , then $48(a+b)$ is equal to _____.

Given 15
Answer :

Question Type : SA
Question ID : 533543856
Status : Answered

Q.22 Let $A = \{1, 2, 3, \dots, 7\}$ and let $P(A)$ denote the power set of A . If the number of functions $f: A \rightarrow P(A)$ such that $a \in f(a), \forall a \in A$ is m^n , m and $n \in \mathbf{N}$ and m is least, then $m+n$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543847
Status : Not Answered

Q.23 A group of 40 students appeared in an examination of 3 subjects - Mathematics, Physics and Chemistry. It was found that all students passed in atleast one of the subjects, 20 students passed in Mathematics, 25 students passed in Physics, 16 students passed in Chemistry, atmost 11 students passed in both Mathematics and Physics, atmost 15 students passed in both Physics and Chemistry, atmost 15 students passed in both Mathematics and Chemistry. The maximum number of students passed in all the three subjects is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543855
Status : Not Answered

Q.24 The value of $9 \int_0^9 \left[\frac{10x}{\sqrt{x+1}} \right] dx$, where $[t]$ denotes the greatest integer less than or equal to t , is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543851
Status : Not Attempted and Marked For Review

Q.25 If d_1 is the shortest distance between the lines $x+1=2y=-12z$, $x=y+2=6z-6$ and d_2 is the shortest distance between the lines $\frac{x-1}{2} = \frac{y+8}{-7} = \frac{z-4}{5}$, $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-6}{-3}$, then the value of $\frac{32\sqrt{3} d_1}{d_2}$ is :

Given 16
Answer :

Question Type : SA
Question ID : 533543854
Status : Answered

Q.26 Let the latus ractum of the hyperbola $\frac{x^2}{9} - \frac{y^2}{b^2} = 1$ subtend an angle of $\frac{\pi}{3}$ at the centre of the hyperbola. If b^2 is equal to $\frac{l}{m}(1 + \sqrt{n})$, where l and m are co-prime numbers, then $l^2 + m^2 + n^2$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543853
Status : Not Attempted and Marked For Review

Q.27 Number of integral terms in the expansion of $\left\{7\left(\frac{1}{2}\right) + 11\left(\frac{1}{6}\right)\right\}^{824}$ is equal to _____.

Given 138
Answer :

Question Type : SA
Question ID : 533543849
Status : Answered

Q.28 Let $\alpha, \beta \in \mathbb{N}$ be roots of the equation $x^2 - 70x + \lambda = 0$, where $\frac{\lambda}{2}, \frac{\lambda}{3} \notin \mathbb{N}$. If λ assumes the minimum possible value, then $\frac{(\sqrt{\alpha-1} + \sqrt{\beta-1})(\lambda + 35)}{|\alpha - \beta|}$ is equal to :

Given --
Answer :

Question Type : SA
Question ID : 533543848
Status : Not Answered

Q.29 Let $\alpha = 1^2 + 4^2 + 8^2 + 13^2 + 19^2 + 26^2 + \dots$ upto 10 terms and $\beta = \sum_{n=1}^{10} n^4$. If $4\alpha - \beta = 55k + 40$, then k is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543850
Status : Not Answered

Q.30

Let $y = y(x)$ be the solution of the differential equation $(1 - x^2) dy = [xy + (x^3 + 2)\sqrt{3(1 - x^2)}] dx$,

$-1 < x < 1, y(0) = 0$. If $y\left(\frac{1}{2}\right) = \frac{m}{n}$, m and n are co-prime numbers, then $m + n$ is equal to _____.

Given --
Answer :

Question Type : **SA**Question ID : **533543852**Status : **Not Answered**Section : **Physics Section A****Q.31****Match List - I with List - II.****List - I**

- (A) Coefficient of viscosity
(B) Surface tension
(C) Angular momentum
(D) Rotational kinetic energy

List - II

- (I) $[M L^2 T^{-2}]$
(II) $[M L^2 T^{-1}]$
(III) $[M L^{-1} T^{-1}]$
(IV) $[M L^0 T^{-2}]$

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

Options

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

Question Type : **MCQ**Question ID : **533543857**Option 1 ID : **5335432804**Option 2 ID : **5335432803**Option 3 ID : **5335432802**Option 4 ID : **5335432801**Status : **Answered**Chosen Option : **3**

Q.32

A series L.R circuit connected with an ac source $E = (25 \sin 1000 t)$ V has a power factor of $\frac{1}{\sqrt{2}}$. If the source of emf is changed to $E = (20 \sin 2000 t)$ V, the new power factor of the circuit will be :

Options

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

2. $\frac{1}{\sqrt{7}}$

3. $\frac{1}{\sqrt{5}}$

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

Question Type : **MCQ**Question ID : **533543869**Option 1 ID : **5335432849**Option 2 ID : **5335432852**Option 3 ID : **5335432851**Option 4 ID : **5335432850**Status : **Answered**Chosen Option : **3****Q.33**

The ratio of the magnitude of the kinetic energy to the potential energy of an electron in the 5th excited state of a hydrogen atom is :

Options

1. 1

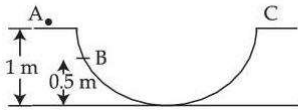
2. $\frac{1}{4}$

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

4. 4

Question Type : **MCQ**Question ID : **533543873**Option 1 ID : **5335432865**Option 2 ID : **5335432867**Option 3 ID : **5335432866**Option 4 ID : **5335432868**Status : **Answered**Chosen Option : **3**

- Q.34** A particle is placed at the point A of a frictionless track ABC as shown in figure. It is gently pushed towards right. The speed of the particle when it reaches the point B is : (Take $g = 10 \text{ m/s}^2$).



Options

1. 10 m/s
2. $2\sqrt{10} \text{ m/s}$
3. $\sqrt{10} \text{ m/s}$
4. 20 m/s

Question Type : **MCQ**

Question ID : **533543861**

Option 1 ID : **5335432817**

Option 2 ID : **5335432819**

Option 3 ID : **5335432818**

Option 4 ID : **5335432820**

Status : **Answered**

Chosen Option : **3**

- Q.35** The gravitational potential at a point above the surface of earth is $-5.12 \times 10^7 \text{ J/kg}$ and the acceleration due to gravity at that point is 6.4 m/s^2 . Assume that the mean radius of earth to be 6400 km . The height of this point above the earth's surface is :

Options

1. 540 km
2. 1000 km
3. 1600 km
4. 1200 km

Question Type : **MCQ**

Question ID : **533543862**

Option 1 ID : **5335432823**

Option 2 ID : **5335432822**

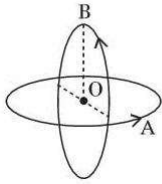
Option 3 ID : **5335432821**

Option 4 ID : **5335432824**

Status : **Answered**

Chosen Option : **3**

- Q.36** Two insulated circular loop A and B of radius 'a' carrying a current of 'I' in the anti clockwise direction as shown in the figure. The magnitude of the magnetic induction at the centre will be :



Options

1. $\frac{\mu_0 I}{2 a}$
2. $\frac{2 \mu_0 I}{a}$
3. $\frac{\mu_0 I}{\sqrt{2} a}$
4. $\frac{\sqrt{2} \mu_0 I}{a}$

Question Type : **MCQ**

Question ID : **533543868**

Option 1 ID : **5335432848**

Option 2 ID : **5335432847**

Option 3 ID : **5335432845**

Option 4 ID : **5335432846**

Status : **Answered**

Chosen Option : **3**

- Q.37** A spherical body of mass 100 g is dropped from a height of 10 m from the ground. After hitting the ground, the body rebounds to a height of 5 m. The impulse of force imparted by the ground to the body is given by : (given, $g = 9.8 \text{ m/s}^2$)

Options

1. 23.9 kg ms^{-1}
2. 4.32 kg ms^{-1}
3. 43.2 kg ms^{-1}
4. 2.39 kg ms^{-1}

Question Type : **MCQ**

Question ID : **533543859**

Option 1 ID : **5335432811**

Option 2 ID : **5335432812**

Option 3 ID : **5335432810**

Option 4 ID : **5335432809**

Status : **Answered**

Chosen Option : **2**

Q.38 A particle of mass m is projected with a velocity ' u ' making an angle of 30° with the horizontal. The magnitude of angular momentum of the projectile about the point of projection when the particle is at its maximum height h is :

Options

1. $\frac{\sqrt{3}}{2} \frac{mu^2}{g}$

2. $\frac{mu^3}{\sqrt{2} g}$

3. zero

4. $\frac{\sqrt{3}}{16} \frac{mu^3}{g}$

Question Type : **MCQ**

Question ID : **533543858**

Option 1 ID : **5335432805**

Option 2 ID : **5335432808**

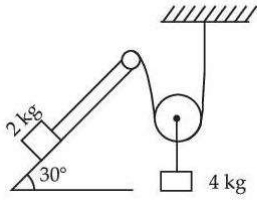
Option 3 ID : **5335432806**

Option 4 ID : **5335432807**

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

Chosen Option : --

- Q.39** All surfaces shown in figure are assumed to be frictionless and the pulleys and the string are light.
The acceleration of the block of mass 2 kg is :



Options

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

Question Type : **MCQ**

Question ID : **533543860**

Option 1 ID : **5335432816**

Option 2 ID : **5335432814**

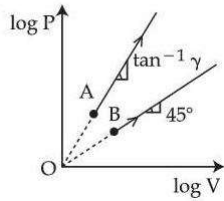
Option 3 ID : **5335432815**

Option 4 ID : **5335432813**

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

Chosen Option : --

- Q.40** Two thermodynamical processes are shown in the figure. The molar heat capacity for process A and B are C_A and C_B . The molar heat capacity at constant pressure and constant volume are represented by C_P and C_V , respectively. Choose the correct statement.



Options

1. $C_A > C_P > C_V$
2. $C_A = 0$ and $C_B = \infty$
3. $C_B = \infty, C_A = 0$
4. $C_P > C_V > C_A = C_B$

Question Type : **MCQ**

Question ID : **533543864**

Option 1 ID : **5335432829**

Option 2 ID : **5335432831**

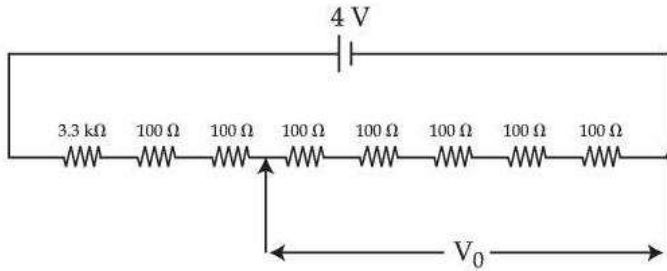
Option 3 ID : **5335432832**

Option 4 ID : **5335432830**

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

Chosen Option : --

Q.41 A potential divider circuit is shown in figure. The output voltage V_0 is :



- Options**
1. 0.5 V
 2. 2 mV
 3. 12 mV
 4. 4 V

Question Type : **MCQ**

Question ID : **533543875**

Option 1 ID : **5335432875**

Option 2 ID : **5335432874**

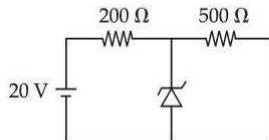
Option 3 ID : **5335432873**

Option 4 ID : **5335432876**

Status : **Answered**

Chosen Option : 1

Q.42 A Zener diode of breakdown voltage 10 V is used as a voltage regulator as shown in the figure. The current through the Zener diode is :



- Options**
1. 50 mA
 2. 0
 3. 20 mA
 4. 30 mA

Question Type : **MCQ**

Question ID : **533543874**

Option 1 ID : **5335432872**

Option 2 ID : **5335432869**

Option 3 ID : **5335432870**

Option 4 ID : **5335432871**

Status : **Answered**

Chosen Option : 4

Q.43 Young's modulus of material of a wire of length ' L ' and cross-sectional area A is Y . If the length of the wire is doubled and cross-sectional area is halved then Young's modulus will be :

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

Question Type : **MCQ**

Question ID : **533543863**

Option 1 ID : **5335432828**

Option 2 ID : **5335432826**

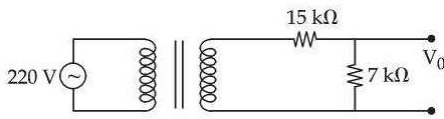
Option 3 ID : **5335432827**

Option 4 ID : **5335432825**

Status : **Answered**

Chosen Option : **3**

Q.44 Primary coil of a transformer is connected to 220 V ac. Primary and secondary turns of the transformer are 100 and 10 respectively. Secondary coil of transformer is connected to two series resistances shown in figure. The output voltage (V_0) is :



- Options
1. 22 V
 2. 7 V
 3. 44 V
 4. 15 V

Question Type : **MCQ**

Question ID : **533543876**

Option 1 ID : **5335432877**

Option 2 ID : **5335432878**

Option 3 ID : **5335432880**

Option 4 ID : **5335432879**

Status : **Answered**

Chosen Option : **4**

Q.45 At which temperature the r.m.s. velocity of a hydrogen molecule equal to that of an oxygen molecule at 47°C ?

Options

1. 20 K
2. 80 K
3. 4 K
4. -73 K

Question Type : **MCQ**

Question ID : **533543865**

Option 1 ID : **5335432833**

Option 2 ID : **5335432834**

Option 3 ID : **5335432836**

Option 4 ID : **5335432835**

Status : **Answered**

Chosen Option : 1

Q.46 An electric toaster has resistance of $60\ \Omega$ at room temperature (27°C). The toaster is connected to a $220\ \text{V}$ supply. If the current flowing through it reaches $2.75\ \text{A}$, the temperature attained by toaster is around : (if $\alpha = 2 \times 10^{-4}/^\circ\text{C}$)

Options

1. 1667°C
2. 1235°C
3. 1694°C
4. 694°C

Question Type : **MCQ**

Question ID : **533543867**

Option 1 ID : **5335432842**

Option 2 ID : **5335432844**

Option 3 ID : **5335432843**

Option 4 ID : **5335432841**

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

Chosen Option : --

Q.47 The electric field of an electromagnetic wave in free space is represented as $\vec{E} = E_0 \cos(\omega t - kz) \hat{i}$.
The corresponding magnetic induction vector will be :

Options

1. $\vec{B} = \frac{E_0}{C} \cos(\omega t + kz) \hat{j}$
2. $\vec{B} = E_0 C \cos(\omega t - kz) \hat{j}$
3. $\vec{B} = \frac{E_0}{C} \cos(\omega t - kz) \hat{j}$
4. $\vec{B} = E_0 C \cos(\omega t + kz) \hat{j}$

Question Type : **MCQ**

Question ID : **533543870**

Option 1 ID : **5335432855**

Option 2 ID : **5335432854**

Option 3 ID : **5335432853**

Option 4 ID : **5335432856**

Status : **Answered**

Chosen Option : **3**

Q.48 The diffraction pattern of a light of wavelength 400 nm diffracting from a slit of width 0.2 mm is focused on the focal plane of a convex lens of focal length 100 cm. The width of the 1st secondary maxima will be :

Options

1. **2 mm**
2. **0.02 mm**
3. **2 cm**
4. **0.2 mm**

Question Type : **MCQ**

Question ID : **533543871**

Option 1 ID : **5335432857**

Option 2 ID : **5335432859**

Option 3 ID : **5335432860**

Option 4 ID : **5335432858**

Status : **Not Answered**

Chosen Option : **--**

Q.49 The electrostatic potential due to an electric dipole at a distance 'r' varies as :

Options

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

2. r

3. $\frac{1}{r^3}$

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

Question Type : **MCQ**

Question ID : **533543866**

Option 1 ID : **5335432838**

Option 2 ID : **5335432840**

Option 3 ID : **5335432839**

Option 4 ID : **5335432837**

Status : **Answered**

Chosen Option : 1

Q.50 The work function of a substance is 3.0 eV. The longest wavelength of light that can cause the emission of photoelectrons from this substance is approximately;

Options

1. **414 nm**

2. 200 nm

3. 215 nm

4. 400 nm

Question Type : **MCQ**

Question ID : **533543872**

Option 1 ID : **5335432862**

Option 2 ID : **5335432863**

Option 3 ID : **5335432864**

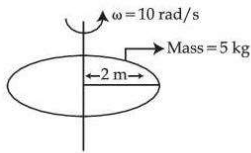
Option 4 ID : **5335432861**

Status : **Answered**

Chosen Option : 1

Section : **Physics Section B**

Q.51



Consider a Disc of mass 5 kg, radius 2 m, rotating with angular velocity of 10 rad/s about an axis perpendicular to the plane of rotation. An identical disc is kept gently over the rotating disc along the same axis. The energy dissipated so that both the discs continue to rotate together without slipping is _____ J.

Given 500

Answer :

Question Type : SA

Question ID : 533543878

Status : Answered

Q.52

The distance between object and its two times magnified real image as produced by a convex lens is 45 cm. The focal length of the lens used is _____ cm.

Given --

Answer :

Question Type : SA

Question ID : 533543885

Status : Not Attempted and Marked For Review

Q.53

A capacitor of capacitance C and potential V has energy E. It is connected to another capacitor of capacitance 2 C and potential 2 V. Then the loss of energy is $\frac{x}{3} E$, where x is _____.

Given --

Answer :

Question Type : SA

Question ID : 533543881

Status : Not Answered

Q.54

The horizontal component of earth's magnetic field at a place is $3.5 \times 10^{-5} \text{ T}$. A very long straight conductor carrying current of $\sqrt{2} \text{ A}$ in the direction from South east to North West is placed. The force per unit length experienced by the conductor is _____ $\times 10^{-6} \text{ N/m}$.

Given --

Answer :

Question Type : SA

Question ID : 533543883

Status : Not Attempted and Marked For Review

Q.55

A ceiling fan having 3 blades of length 80 cm each is rotating with an angular velocity of 1200 rpm. The magnetic field of earth in that region is 0.5 G and angle of dip is 30° . The emf induced across the blades is $N \pi \times 10^{-5} \text{ V}$. The value of N is _____.

Given --

Answer :

Question Type : SA

Question ID : 533543884

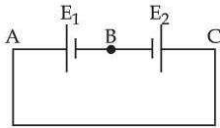
Status : Not Answered

- Q.56** The displacement and the increase in the velocity of a moving particle in the time interval of t to $(t+1)$ s are 125 m and 50 m/s, respectively. The distance travelled by the particle in $(t+2)^{\text{th}}$ s is _____ m.

Given --
Answer :

Question Type : **SA**
Question ID : **533543877**
Status : **Not Answered**

- Q.57** Two cells are connected in opposition as shown. Cell E_1 is of 8 V emf and 2Ω internal resistance; the cell E_2 is of 2 V emf and 4Ω internal resistance. The terminal potential difference of cell E_2 is _____ V.



Given --
Answer :

Question Type : **SA**
Question ID : **533543882**
Status : **Not Answered**

- Q.58** In a closed organ pipe, the frequency of fundamental note is 30 Hz. A certain amount of water is now poured in the organ pipe so that the fundamental frequency is increased to 110 Hz. If the organ pipe has a cross-sectional area of 2 cm^2 , the amount of water poured in the organ tube is _____ g. (Take speed of sound in air is 330 m/s)

Given --
Answer :

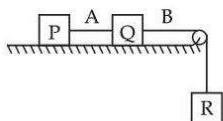
Question Type : **SA**
Question ID : **533543880**
Status : **Not Attempted and Marked For Review**

- Q.59** A electron of hydrogen atom on an excited state is having energy $E_n = -0.85 \text{ eV}$. The maximum number of allowed transitions to lower energy level is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **533543886**
Status : **Not Answered**

- Q.60** Each of three blocks P, Q and R shown in figure has a mass of 3 kg. Each of the wires A and B has cross-sectional area 0.005 cm^2 and Young's modulus $2 \times 10^{11} \text{ N m}^{-2}$. Neglecting friction, the longitudinal strain on wire B is $\text{_____} \times 10^{-4}$. (Take $g = 10 \text{ m/s}^2$)



Given 3
Answer :

Question Type : **SA**

Question ID : **533543879**

Status : **Answered**

Section : **Chemistry Section A**

- Q.61** The Lassaigne's extract is boiled with dil HNO_3 before testing for halogens because,

Options

1. Na_2S and NaCN are decomposed by HNO_3 .
2. Ag_2S is soluble in HNO_3 .
3. AgCN is soluble in HNO_3 .
4. Silver halides are soluble in HNO_3 .

Question Type : **MCQ**

Question ID : **533543895**

Option 1 ID : **5335432924**

Option 2 ID : **5335432925**

Option 3 ID : **5335432926**

Option 4 ID : **5335432923**

Status : **Answered**

Chosen Option : 1

Q.62

Diamagnetic Lanthanoid ions are :

Options

1. Lu^{3+} & Eu^{3+}
2. La^{3+} & Ce^{4+}
3. Nd^{3+} & Ce^{4+}
4. Nd^{3+} & Eu^{3+}

Question Type : **MCQ**Question ID : **533543893**Option 1 ID : **5335432917**Option 2 ID : **5335432916**Option 3 ID : **5335432915**Option 4 ID : **5335432918**Status : **Answered**Chosen Option : **2**

Q.63

Sugar which does not give reddish brown precipitate with Fehling's reagent, is :

Options

1. Maltose
2. Sucrose
3. Glucose
4. Lactose

Question Type : **MCQ**Question ID : **533543904**Option 1 ID : **5335432960**Option 2 ID : **5335432962**Option 3 ID : **5335432959**Option 4 ID : **5335432961**Status : **Answered**Chosen Option : **2**

Q.64 Aluminium chloride in acidified aqueous solution forms an ion having geometry

Options

1. Trigonal bipyramidal
2. Tetrahedral
3. Square planar
4. Octahedral

Question Type : **MCQ**

Question ID : **533543890**

Option 1 ID : **5335432906**

Option 2 ID : **5335432903**

Option 3 ID : **5335432905**

Option 4 ID : **5335432904**

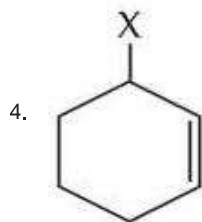
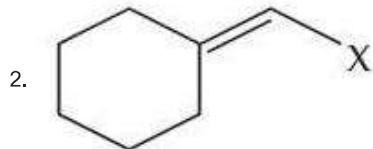
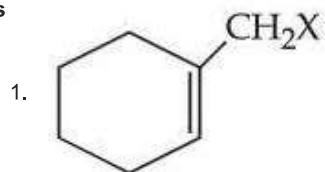
Status : **Answered**

Chosen Option : **3**

Q.65

Example of vinylic halide is :

Options

Question Type : **MCQ**Question ID : **533543899**Option 1 ID : **5335432939**Option 2 ID : **5335432941**Option 3 ID : **5335432942**Option 4 ID : **5335432940**Status : **Answered**Chosen Option : **4**

Q.66 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.
Assertion (A) : There is a considerable increase in covalent radius from N to P. However from As to Bi only a small increase in covalent radius is observed.
Reason (R) : Covalent and ionic radii in a particular oxidation state increases down the group.
In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

1. **(A) is true but (R) is false**
2. Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**
3. **(A) is false but (R) is true**
4. Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

Question Type : **MCQ**

Question ID : **533543891**

Option 1 ID : **5335432909**

Option 2 ID : **5335432908**

Option 3 ID : **5335432910**

Option 4 ID : **5335432907**

Status : **Answered**

Chosen Option : **2**

Q.67 Match List - I with List - II.

List - I	List - II
Molecule	Shape
(A) BrF_5	(I) T-shape
(B) H_2O	(II) See saw
(C) ClF_3	(III) Bent
(D) SF_4	(IV) Square pyramidal

Choose the correct answer from the options given below :

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

Question Type : MCQ

Question ID : 533543888

Option 1 ID : 5335432895

Option 2 ID : 5335432896

Option 3 ID : 5335432897

Option 4 ID : 5335432898

Status : Answered

Chosen Option : 3

Q.68 Given below are two statements :

Statement (I) : The gas liberated on warming a salt with dil H_2SO_4 , turns a piece of paper dipped in lead acetate into black, it is a confirmatory test for sulphide ion.

Statement (II) : In statement-I the colour of paper turns black because of formation of lead sulphite.

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

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

Question Type : MCQ

Question ID : 533543905

Option 1 ID : 5335432965

Option 2 ID : 5335432963

Option 3 ID : 5335432964

Option 4 ID : 5335432966

Status : Answered

Chosen Option : 2

Q.69 Given below are two statements :

Statement (I) : The orbitals having same energy are called as degenerate orbitals.

Statement (II) : In hydrogen atom, 3p and 3d orbitals are not degenerate orbitals.

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

Options

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

Question Type : **MCQ**

Question ID : **533543887**

Option 1 ID : **5335432892**

Option 2 ID : **5335432894**

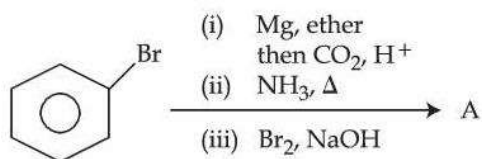
Option 3 ID : **5335432891**

Option 4 ID : **5335432893**

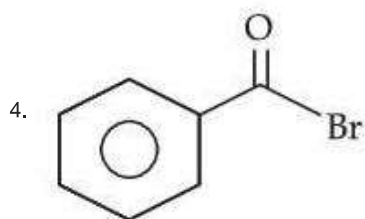
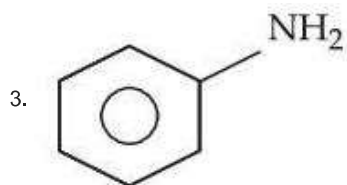
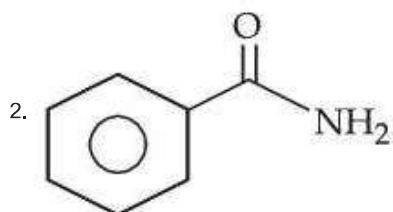
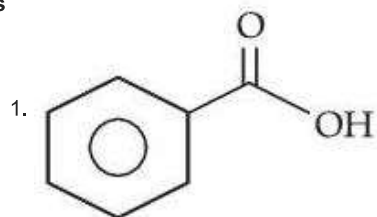
Status : **Answered**

Chosen Option : **1**

Q.70 The final product A, formed in the following multistep reaction sequence is :



Options



Question Type : **MCQ**

Question ID : **533543903**

Option 1 ID : **5335432956**

Option 2 ID : **5335432955**

Option 3 ID : **5335432958**

Option 4 ID : **5335432957**

Status : **Answered**

Chosen Option : **3**

Q.71 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : $\text{CH}_2=\text{CH}-\text{CH}_2-\text{Cl}$ is an example of allyl halide.

Reason (R) : Allyl halides are the compounds in which the halogen atom is attached to sp^2 hybridised carbon atom.

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

Options 1.

Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

2. **(A)** is true but **(R)** is false

3. **(A)** is false but **(R)** is true

4.

Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**

Question Type : **MCQ**

Question ID : **533543900**

Option 1 ID : **5335432943**

Option 2 ID : **5335432945**

Option 3 ID : **5335432946**

Option 4 ID : **5335432944**

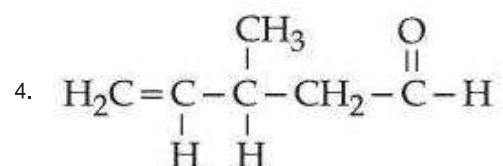
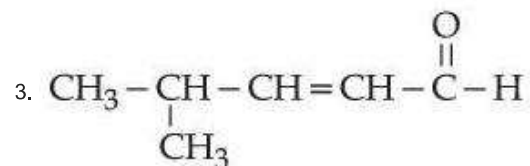
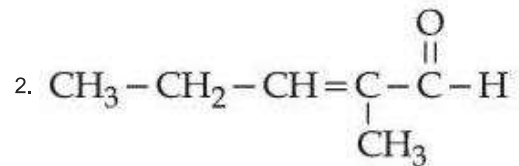
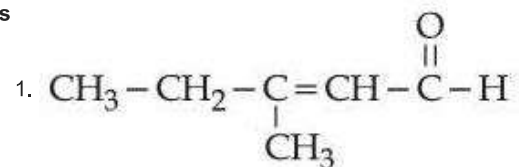
Status : **Answered**

Chosen Option : **2**

Q.72

Structure of 4-Methylpent-2-enal is :

Options

Question Type : **MCQ**Question ID : **533543896**Option 1 ID : **5335432927**Option 2 ID : **5335432929**Option 3 ID : **5335432928**Option 4 ID : **5335432930**Status : **Answered**Chosen Option : **3**

Q.73

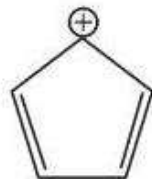
Which of the following molecule/species is most stable ?

Options

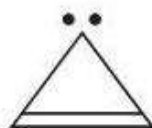
1.



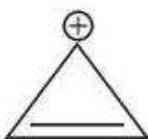
2.



3.



4.

Question Type : **MCQ**Question ID : **533543897**Option 1 ID : **5335432931**Option 2 ID : **5335432932**Option 3 ID : **5335432933**Option 4 ID : **5335432934**Status : **Answered**Chosen Option : **4**

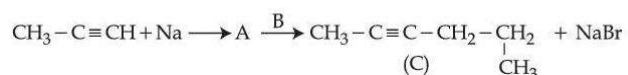
Q.74

What happens to freezing point of benzene when small quantity of naphthalene is added to benzene ?

Options

1. **Decreases**2. **Remains unchanged**3. **First decreases and then increases**4. **Increases**Question Type : **MCQ**Question ID : **533543889**Option 1 ID : **5335432900**Option 2 ID : **5335432901**Option 3 ID : **5335432902**Option 4 ID : **5335432899**Status : **Not Attempted and
Marked For Review**Chosen Option : **--**

Q.75 Compound A formed in the following reaction reacts with B gives the product C. Find out A and B.



Options

1. $\text{A} = \text{CH}_3-\text{CH}_2-\text{CH}_3$, $\text{B} = \text{CH}_3-\text{C}\equiv\text{CH}$
2. $\text{A} = \text{CH}_3-\text{CH}=\text{CH}_2$, $\text{B} = \text{CH}_3-\text{CH}_2-\text{CH}_2-\text{Br}$
3. $\text{A} = \text{CH}_3-\text{C}\equiv\overset{-}{\text{C}}\overset{+}{\text{N}}\text{a}$, $\text{B} = \text{CH}_3-\text{CH}_2-\text{CH}_2-\text{Br}$
4. $\text{A} = \text{CH}_3-\text{C}\equiv\overset{-}{\text{C}}\overset{+}{\text{N}}\text{a}$, $\text{B} = \text{CH}_3-\text{CH}_2-\text{CH}_3$

Question Type : **MCQ**

Question ID : **533543898**

Option 1 ID : **5335432937**

Option 2 ID : **5335432938**

Option 3 ID : **5335432935**

Option 4 ID : **5335432936**

Status : **Answered**

Chosen Option : **3**

Q.76 Choose the correct statements from the following :

- (A) Ethane-1, 2-diamine is a chelating ligand.
- (B) Metallic aluminium is produced by electrolysis of aluminium oxide in presence of cryolite.
- (C) Cyanide ion is used as ligand for leaching of silver.
- (D) Phosphine act as a ligand in Wilkinson catalyst.
- (E) The stability constants of Ca^{2+} and Mg^{2+} are similar with EDTA complexes.

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

Options

1. (C), (D), (E) only
2. (A), (B), (C) only
3. (B), (C), (E) only
4. (A), (D), (E) only

Question Type : **MCQ**

Question ID : **533543894**

Option 1 ID : **5335432920**

Option 2 ID : **5335432921**

Option 3 ID : **5335432919**

Option 4 ID : **5335432922**

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

Chosen Option : **--**

Q.77

Match List - I with List - II.

List - I		List - II	
Species		Electronic distribution	
(A)	Cr^{+2}	(I)	$3d^8$
(B)	Mn^+	(II)	$3d^34s^1$
(C)	Ni^{+2}	(III)	$3d^4$
(D)	V^+	(IV)	$3d^54s^1$

Choose the correct answer from the options given below :

Options

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

Question Type : MCQ

Question ID : 533543892

Option 1 ID : 5335432911

Option 2 ID : 5335432912

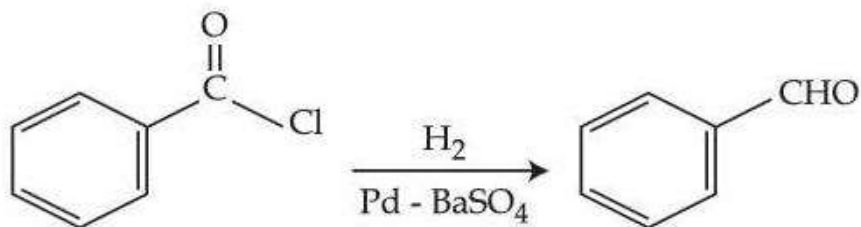
Option 3 ID : 5335432914

Option 4 ID : 5335432913

Status : Answered

Chosen Option : 3

Q.78



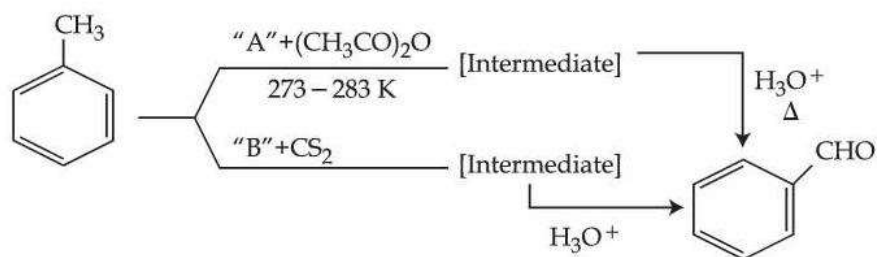
This reduction reaction is known as :

Options

1. Etard reduction
2. Stephen reduction
3. Rosenmund reduction
4. Wolff-Kishner reduction

Question Type : **MCQ**Question ID : **533543902**Option 1 ID : **5335432951**Option 2 ID : **5335432953**Option 3 ID : **5335432954**Option 4 ID : **5335432952**Status : **Answered**Chosen Option : **3**

Q.79 In the given reactions, identify the reagent A and reagent B.



Options

1. A- CrO_3 B- CrO_3
2. A- CrO_2Cl_2 B- CrO_3
3. A- CrO_2Cl_2 B- CrO_2Cl_2
4. A- CrO_3 B- CrO_2Cl_2

Question Type : MCQ

Question ID : 533543901

Option 1 ID : 5335432947

Option 2 ID : 5335432949

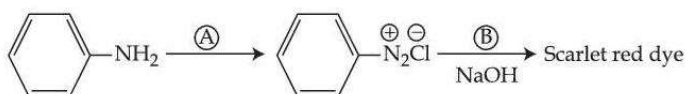
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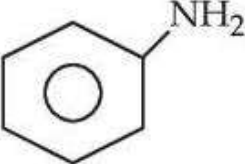
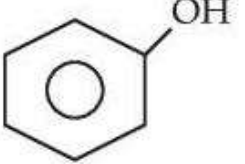
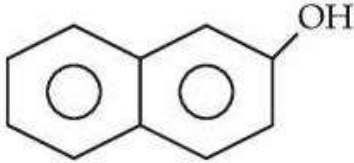
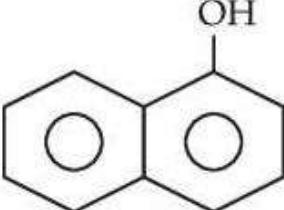
Status : Answered

Chosen Option : 4

Q.80 Following is a confirmatory test for aromatic primary amines. Identify reagent (A) and (B).



Options

1. $A = \text{NaNO}_2 + \text{HCl}, 0 - 5^\circ\text{C}$; B = 
2. $A = \text{HNO}_3/\text{H}_2\text{SO}_4$; B = 
3. $A = \text{NaNO}_2 + \text{HCl}, 0 - 5^\circ\text{C}$; B = 
4. $A = \text{NaNO}_2 + \text{HCl}, 0 - 5^\circ\text{C}$; B = 

Question Type : **MCQ**

Question ID : **533543906**

Option 1 ID : **5335432970**

Option 2 ID : **5335432969**

Option 3 ID : **5335432967**

Option 4 ID : **5335432968**

Status : **Answered**

Chosen Option : **3**

Section : **Chemistry Section B**

Q.81 The pH at which $\text{Mg}(\text{OH})_2$ [$K_{sp} = 1 \times 10^{-11}$] begins to precipitate from a solution containing 0.10 M Mg^{2+} ions is _____.

Given 9
Answer :

Question Type : **SA**

Question ID : **533543910**

Status : **Answered**

Q.82 The total number of molecular orbitals formed from 2s and 2p atomic orbitals of a diatomic molecule is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543908
Status : Not Answered

Q.83 The mass of sodium acetate (CH_3COONa) required to prepare 250 mL of 0.35 M aqueous solution is _____ g. (Molar mass of CH_3COONa is 82.02 g mol^{-1})

Given 7
Answer :

Question Type : SA
Question ID : 533543907
Status : Answered

Q.84 0.05 cm thick coating of silver is deposited on a plate of 0.05 m^2 area. The number of silver atoms deposited on plate are _____ $\times 10^{23}$. (At mass Ag = 108, $d = 7.9 \text{ g cm}^{-3}$)

Given --
Answer :

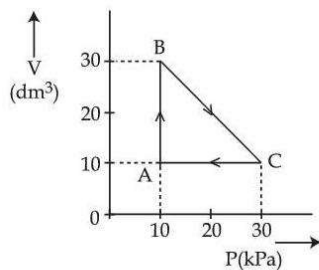
Question Type : SA
Question ID : 533543912
Status : Not Answered

Q.85 The compound formed by the reaction of ethanal with semicarbazide contains _____ number of nitrogen atoms.

Given --
Answer :

Question Type : SA
Question ID : 533543916
Status : Not Answered

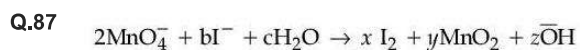
Q.86



An ideal gas undergoes a cyclic transformation starting from the point A and coming back to the same point by tracing the path $A \rightarrow B \rightarrow C \rightarrow A$ as shown in the diagram above. The total work done in the process is _____ J.

Given --
Answer :

Question Type : SA
Question ID : 533543909
Status : Not Answered



If the above equation is balanced with integer coefficients, the value of z is _____.

Given 8

Answer :

Question Type : SA

Question ID : 533543911

Status : Answered

Q.88 On a thin layer chromatographic plate, an organic compound moved by 3.5 cm, while the solvent moved by 5 cm. The retardation factor of the organic compound is _____ $\times 10^{-1}$.

Given 7

Answer :

Question Type : SA

Question ID : 533543915

Status : Answered

Q.89 The rate of First order reaction is $0.04 \text{ mol L}^{-1} \text{ s}^{-1}$ at 10 minutes and $0.03 \text{ mol L}^{-1} \text{ s}^{-1}$ at 20 minutes after initiation. Half life of the reaction is _____ minutes. (Given $\log 2 = 0.3010$, $\log 3 = 0.4771$)

Given --

Answer :

Question Type : SA

Question ID : 533543913

Status : Not Answered

Q.90 If IUPAC name of an element is "Unununnium" then the element belongs to n^{th} group of Periodic table. The value of n is _____.

Given --

Answer :

Question Type : SA

Question ID : 533543914

Status : Not Answered