

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

Application No	
Candidate Name	
Roll No.	
Test Date	31/01/2024
Test Time	3:00 PM - 6:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 Let 2^{nd} , 8^{th} and 44^{th} terms of a non-constant A. P. be respectively the 1^{st} , 2^{nd} and 3^{rd} terms of a G. P. If the first term of the A. P. is 1, then the sum of its first 20 terms is equal to -

- Options
1. 990
 2. 970
 3. 960
 4. 980

Question Type : **MCQ**

Question ID : **4058591201**

Option 1 ID : **4058593798**

Option 2 ID : **4058593796**

Option 3 ID : **4058593795**

Option 4 ID : **4058593797**

Status : **Not Answered**

Chosen Option : --

Q.2 Let $f: \mathbb{R} \rightarrow (0, \infty)$ be strictly increasing function such that $\lim_{x \rightarrow \infty} \frac{f(7x)}{f(x)} = 1$. Then,

the value of $\lim_{x \rightarrow \infty} \left[\frac{f(5x)}{f(x)} - 1 \right]$ is equal to

- Options
1. 4
 2. 1
 3. $\frac{7}{5}$
 4. 0

Question Type : **MCQ**

Question ID : **4058591203**

Option 1 ID : **4058593805**

Option 2 ID : **4058593803**

Option 3 ID : **4058593804**

Option 4 ID : **4058593806**

Status : **Not Answered**

Chosen Option : --

Q.3 A coin is biased so that a head is twice as likely to occur as a tail. If the coin is tossed 3 times, then the probability of getting two tails and one head is

- Options
1. $\frac{1}{9}$
 2. $\frac{2}{27}$
 3. $\frac{2}{9}$
 4. $\frac{1}{27}$

Question Type : **MCQ**

Question ID : **4058591213**

Option 1 ID : **4058593845**

Option 2 ID : **4058593844**

Option 3 ID : **4058593846**

Option 4 ID : **4058593843**

Status : **Not Answered**

Chosen Option : --

Q.4 Consider the function $f: (0, \infty) \rightarrow \mathbb{R}$ defined by $f(x) = e^{-|\log_e x|}$. If m and n be respectively the number of points at which f is **not** continuous and f is **not** differentiable, then $m + n$ is

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

Question Type : **MCQ**

Question ID : **4058591202**

Option 1 ID : **4058593800**

Option 2 ID : **4058593799**

Option 3 ID : **4058593801**

Option 4 ID : **4058593802**

Status : **Answered**

Chosen Option : **2**

Q.5 Let A be a 3×3 real matrix such that

$$A \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} = 2 \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, A \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix} = 4 \begin{pmatrix} -1 \\ 0 \\ 1 \end{pmatrix}, A \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix} = 2 \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}.$$

Then, the system $(A-3I) \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$ has

- Options
1. no solution
 2. exactly two solutions
 3. unique solution
 4. infinitely many solutions

Question Type : **MCQ**

Question ID : **4058591198**

Option 1 ID : **4058593783**

Option 2 ID : **4058593786**

Option 3 ID : **4058593785**

Option 4 ID : **4058593784**

Status : **Not Answered**

Chosen Option : --

Q.6 The shortest distance, between lines L_1 and L_2 , where $L_1 : \frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+4}{2}$ and L_2 is the line, passing through the points $A(-4, 4, 3)$, $B(-1, 6, 3)$ and perpendicular to the line $\frac{x-3}{-2} = \frac{y}{3} = \frac{z-1}{1}$, is

- Options
1. $\frac{141}{\sqrt{221}}$
 2. $\frac{121}{\sqrt{221}}$
 3. $\frac{42}{\sqrt{117}}$
 4. $\frac{24}{\sqrt{117}}$

Question Type : **MCQ**

Question ID : **4058591211**

Option 1 ID : **4058593838**

Option 2 ID : **4058593837**

Option 3 ID : **4058593836**

Option 4 ID : **4058593835**

Status : **Not Answered**

Chosen Option : --

Q.7 The area of the region enclosed by the parabolas $y = 4x - x^2$ and $3y = (x - 4)^2$ is equal to

- Options 1. $\frac{32}{9}$
 2. 4
 3. $\frac{14}{3}$
 4. 6

Question Type : **MCQ**

Question ID : **4058591205**

Option 1 ID : **4058593813**

Option 2 ID : **4058593814**

Option 3 ID : **4058593811**

Option 4 ID : **4058593812**

Status : **Answered**

Chosen Option : **3**

Q.8 The number of ways in which 21 identical apples can be distributed among three children such that each child gets at least 2 apples, is

- Options 1. 142
 2. 136
 3. 130
 4. 406

Question Type : **MCQ**

Question ID : **4058591199**

Option 1 ID : **4058593789**

Option 2 ID : **4058593788**

Option 3 ID : **4058593787**

Option 4 ID : **4058593790**

Status : **Not Answered**

Chosen Option : **--**

Q.9 Let $f, g : (0, \infty) \rightarrow \mathbb{R}$ be two functions defined by $f(x) = \int_{-x}^x (|t| - t^2) e^{-t^2} dt$ and $g(x) = \int_0^{x^2} t^{1/2} e^{-t} dt$. Then, the value of $9(f(\sqrt{\log_e 9}) + g(\sqrt{\log_e 9}))$ is equal to

- Options 1. 6
 2. 8
 3. 9
 4. 10

Question Type : **MCQ**

Question ID : **4058591206**

Option 1 ID : **4058593816**

Option 2 ID : **4058593815**

Option 3 ID : **4058593817**

Option 4 ID : **4058593818**

Status : **Not Answered**

Chosen Option : **--**

Q.10 The temperature $T(t)$ of a body at time $t = 0$ is 160°F and it decreases continuously as per the differential equation $\frac{dT}{dt} = -K(T - 80)$, where K is a positive constant. If $T(15) = 120^\circ\text{F}$, then $T(45)$ is equal to

- Options
1. 95°F
 2. 85°F
 3. 80°F
 4. 90°F

Question Type : **MCQ**

Question ID : **4058591207**

Option 1 ID : **4058593822**

Option 2 ID : **4058593820**

Option 3 ID : **4058593819**

Option 4 ID : **4058593821**

Status : **Not Answered**

Chosen Option : --

Q.11 If for some m, n , ${}^6C_m + 2({}^6C_{m+1}) + {}^6C_{m+2} > {}^8C_3$ and ${}^{n-1}P_3 : {}^nP_4 = 1 : 8$, then ${}^nP_{m+1} + {}^{n+1}C_m$ is equal to

- Options
1. 380
 2. 384
 3. 372
 4. 376

Question Type : **MCQ**

Question ID : **4058591200**

Option 1 ID : **4058593793**

Option 2 ID : **4058593794**

Option 3 ID : **4058593791**

Option 4 ID : **4058593792**

Status : **Not Answered**

Chosen Option : --

Q.12 Let the mean and the variance of 6 observations $a, b, 68, 44, 48, 60$ be 55 and 194, respectively. If $a > b$, then $a + 3b$ is

- Options
1. 180
 2. 210
 3. 190
 4. 200

Question Type : **MCQ**

Question ID : **4058591212**

Option 1 ID : **4058593839**

Option 2 ID : **4058593842**

Option 3 ID : **4058593840**

Option 4 ID : **4058593841**

Status : **Not Answered**

Chosen Option : --

Q.13 If $a = \sin^{-1}(\sin(5))$ and $b = \cos^{-1}(\cos(5))$, then $a^2 + b^2$ is equal to

- Options
1. $4\pi^2 + 25$
 2. $4\pi^2 - 20\pi + 50$
 3. 25
 4. $8\pi^2 - 40\pi + 50$

Question Type : **MCQ**

Question ID : **4058591214**

Option 1 ID : **4058593848**

Option 2 ID : **4058593849**

Option 3 ID : **4058593847**

Option 4 ID : **4058593850**

Status : **Not Answered**

Chosen Option : --

Q.14 If the function $f: (-\infty, -1] \rightarrow (a, b]$ defined by $f(x) = e^{x^3-3x+1}$ is one - one and onto, then the distance of the point $P(2b + 4, a + 2)$ from the line $x + e^{-3}y = 4$ is :

- Options
1. $3\sqrt{1+e^6}$
 2. $\sqrt{1+e^6}$
 3. $2\sqrt{1+e^6}$
 4. $4\sqrt{1+e^6}$

Question Type : **MCQ**

Question ID : **4058591195**

Option 1 ID : **4058593772**

Option 2 ID : **4058593774**

Option 3 ID : **4058593773**

Option 4 ID : **4058593771**

Status : **Not Answered**

Chosen Option : --

Q.15 Let z_1 and z_2 be two complex numbers such that $z_1 + z_2 = 5$ and $z_1^3 + z_2^3 = 20 + 15i$.

Then, $|z_1^4 + z_2^4|$ equals -

- Options
1. 75
 2. $25\sqrt{3}$
 3. $30\sqrt{3}$
 4. $15\sqrt{15}$

Question Type : **MCQ**

Question ID : **4058591197**

Option 1 ID : **4058593782**

Option 2 ID : **4058593781**

Option 3 ID : **4058593779**

Option 4 ID : **4058593780**

Status : **Not Answered**

Chosen Option : --

Q.16 Let P be a parabola with vertex $(2, 3)$ and directrix $2x + y = 6$. Let an ellipse

$E: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$, of eccentricity $\frac{1}{\sqrt{2}}$ pass through the focus of the parabola P .

Then, the square of the length of the latus rectum of E , is

- Options
1. $\frac{347}{8}$
 2. $\frac{656}{25}$
 3. $\frac{385}{8}$
 4. $\frac{512}{25}$

Question Type : **MCQ**

Question ID : **4058591208**

Option 1 ID : **4058593826**

Option 2 ID : **4058593825**

Option 3 ID : **4058593824**

Option 4 ID : **4058593823**

Status : **Not Answered**

Chosen Option : --

Q.17 Let (α, β, γ) be the mirror image of the point $(2, 3, 5)$ in the line

$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$. Then, $2\alpha + 3\beta + 4\gamma$ is equal to

- Options
1. 32
 2. 34
 3. 31
 4. 33

Question Type : **MCQ**

Question ID : **4058591210**

Option 1 ID : **4058593832**

Option 2 ID : **4058593834**

Option 3 ID : **4058593831**

Option 4 ID : **4058593833**

Status : **Not Answered**

Chosen Option : --

Q.18 The number of solutions, of the equation $e^{\sin x} - 2e^{-\sin x} = 2$, is :

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

Question Type : **MCQ**

Question ID : **4058591196**

Option 1 ID : **4058593775**

Option 2 ID : **4058593778**

Option 3 ID : **4058593777**

Option 4 ID : **4058593776**

Status : **Not Answered**

Chosen Option : --

Q.19 Let a variable line passing through the centre of the circle $x^2 + y^2 - 16x - 4y = 0$, meet the positive co-ordinate axes at the points A and B . Then the minimum value of $OA + OB$, where O is the origin, is equal to

- Options 1. 24
2. 18
3. 12
4. 20

Question Type : **MCQ**

Question ID : **4058591204**

Option 1 ID : **4058593810**

Option 2 ID : **4058593808**

Option 3 ID : **4058593807**

Option 4 ID : **4058593809**

Status : **Not Answered**

Chosen Option : --

Q.20 Let $A(a, b)$, $B(3, 4)$ and $C(-6, -8)$ respectively denote the centroid, circumcentre and orthocentre of a triangle. Then, the distance of the point $P(2a + 3, 7b + 5)$ from the line $2x + 3y - 4 = 0$ measured parallel to the line $x - 2y - 1 = 0$ is

- Options 1. $\frac{17\sqrt{5}}{6}$
2. $\frac{15\sqrt{5}}{7}$
3. $\frac{17\sqrt{5}}{7}$
4. $\frac{\sqrt{5}}{17}$

Question Type : **MCQ**

Question ID : **4058591209**

Option 1 ID : **4058593830**

Option 2 ID : **4058593829**

Option 3 ID : **4058593828**

Option 4 ID : **4058593827**

Status : **Not Answered**

Chosen Option : --

Section : **Mathematics Section B**

Q.21 If $\lim_{x \rightarrow 0} \frac{ax^2e^x - b \log_e(1+x) + cxe^{-x}}{x^2 \sin x} = 1$, then $16(a^2 + b^2 + c^2)$ is equal to

_____.

Given --
Answer :

Question Type : **SA**

Question ID : **4058591219**

Status : **Not Answered**

Q.22 A line passes through $A(4, -6, -2)$ and $B(16, -2, 4)$. The point $P(a, b, c)$, where a, b, c are non-negative integers, on the line AB lies at a distance of 21 units, from the point A . The distance between the points $P(a, b, c)$ and $Q(4, -12, 3)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591223
Status : Not Answered

Q.23 Let A be a 3×3 matrix and $\det(A) = 2$. If $n = \det(\underbrace{\text{adj}(\text{adj}(\dots(\text{adj} A)))}_{2024\text{-times}})$, then the remainder when n is divided by 9 is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591216
Status : Not Answered

Q.24 Let a, b, c be the lengths of three sides of a triangle satisfying the condition $(a^2 + b^2)x^2 - 2b(a + c)x + (b^2 + c^2) = 0$. If the set of all possible values of x is the interval (α, β) , then $12(\alpha^2 + \beta^2)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591218
Status : Not Answered

Q.25 Let the coefficient of x^r in the expansion of $(x + 3)^{n-1} + (x + 3)^{n-2}(x + 2) + (x + 3)^{n-3}(x + 2)^2 + \dots + (x + 2)^{n-1}$ be α_r . If $\sum_{r=0}^n \alpha_r = \beta^n - \gamma^n$, $\beta, \gamma \in \mathbb{N}$, then the value of $\beta^2 + \gamma^2$ equals _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591217
Status : Not Answered

Q.26 Let $\vec{a} = 3\hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} - \hat{j} + 3\hat{k}$ and \vec{c} be a vector such that $(\vec{a} + \vec{b}) \times \vec{c} = 2(\vec{a} \times \vec{b}) + 24\hat{j} - 6\hat{k}$ and $(\vec{a} - \vec{b} + \hat{i}) \cdot \vec{c} = -3$. Then $|\vec{c}|^2$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591224
Status : Not Answered

Q.27 $\left| \frac{120}{\pi^3} \int_0^{\pi} \frac{x^2 \sin x \cos x}{\sin^4 x + \cos^4 x} dx \right|$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **4058591220**
Status : **Not Answered**

Q.28 Let $A(-2, -1)$, $B(1, 0)$, $C(\alpha, \beta)$ and $D(\gamma, \delta)$ be the vertices of a parallelogram $ABCD$. If the point C lies on $2x - y = 5$ and the point D lies on $3x - 2y = 6$, then the value of $|\alpha + \beta + \gamma + \delta|$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **4058591222**
Status : **Not Answered**

Q.29 Let $y = y(x)$ be the solution of the differential equation $\sec^2 x dx + (e^{2y} \tan^2 x + \tan x) dy = 0$, $0 < x < \frac{\pi}{2}$, $y(\frac{\pi}{4}) = 0$. If $y(\frac{\pi}{6}) = \alpha$, then $e^{8\alpha}$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **4058591221**
Status : **Not Answered**

Q.30 Let $A = \{1, 2, 3, \dots, 100\}$. Let R be a relation on A defined by $(x, y) \in R$ if and only if $2x = 3y$. Let R_1 be a symmetric relation on A such that $R \subset R_1$ and the number of elements in R_1 is n . Then, the minimum value of n is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **4058591215**
Status : **Not Answered**

Section : **Physics Section A**

Q.31 If two vectors \vec{A} and \vec{B} having equal magnitude R are inclined at an angle θ , then

Options

1. $|\vec{A} - \vec{B}| = 2R \cos\left(\frac{\theta}{2}\right)$

2. $|\vec{A} - \vec{B}| = \sqrt{2}R \sin\left(\frac{\theta}{2}\right)$

3. $|\vec{A} + \vec{B}| = 2R \sin\left(\frac{\theta}{2}\right)$

4. $|\vec{A} + \vec{B}| = 2R \cos\left(\frac{\theta}{2}\right)$

Question Type : **MCQ**

Question ID : **4058591226**

Option 1 ID : **4058593866**

Option 2 ID : **4058593868**

Option 3 ID : **4058593865**

Option 4 ID : **4058593867**

Status : **Answered**

Chosen Option : **2**

Q.32 A body of mass 2 kg begins to move under the action of a time dependent force given by $\vec{F} = (6t\hat{i} + 6t^2\hat{j}) N$. The power developed by the force at the time t is given by:

Options 1. $(9t^5 + 6t^3) W$

2. $(3t^3 + 6t^5) W$

3. $(9t^3 + 6t^5) W$

4. $(6t^4 + 9t^5) W$

Question Type : **MCQ**

Question ID : **4058591229**

Option 1 ID : **4058593878**

Option 2 ID : **4058593879**

Option 3 ID : **4058593880**

Option 4 ID : **4058593877**

Status : **Not Answered**

Chosen Option : **--**

Q.33 An AC voltage $V = 20 \sin 200\pi t$ is applied to a series LCR circuit which drives a current $I = 10 \sin \left(200 \pi t + \frac{\pi}{3} \right)$. The average power dissipated is:

- Options 1. 21.6 W
2. 173.2 W
3. 200 W
4. 50 W

Question Type : **MCQ**

Question ID : **4058591237**

Option 1 ID : **4058593909**

Option 2 ID : **4058593912**

Option 3 ID : **4058593910**

Option 4 ID : **4058593911**

Status : **Answered**

Chosen Option : **3**

Q.34 The measured value of the length of a simple pendulum is 20 cm with 2 mm accuracy. The time for 50 oscillations was measured to be 40 seconds with 1 second resolution. From these measurements, the accuracy in the measurement of acceleration due to gravity is N%. The value of N is:

- Options 1. 5
2. 6
3. 4
4. 8

Question Type : **MCQ**

Question ID : **4058591244**

Option 1 ID : **4058593940**

Option 2 ID : **4058593937**

Option 3 ID : **4058593938**

Option 4 ID : **4058593939**

Status : **Not Answered**

Chosen Option : **--**

Q.35 Force between two point charges q_1 and q_2 placed in vacuum at ' r ' cm apart is F . Force between them when placed in a medium having dielectric constant $K=5$ at ' $r/5$ ' cm apart will be:

- Options 1. $F/5$
2. $5F$
3. $F/25$
4. $25F$

Question Type : **MCQ**

Question ID : **4058591234**

Option 1 ID : **4058593897**

Option 2 ID : **4058593898**

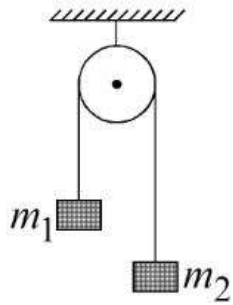
Option 3 ID : **4058593899**

Option 4 ID : **4058593900**

Status : **Answered**

Chosen Option : **2**

Q.36 A light string passing over a smooth light fixed pulley connects two blocks of masses m_1 and m_2 . If the acceleration of the system is $g/8$, then the ratio of masses is:



- Options
1. $\frac{4}{3}$
 2. $\frac{5}{3}$
 3. $\frac{8}{1}$
 4. $\frac{9}{7}$

Question Type : **MCQ**

Question ID : **4058591227**

Option 1 ID : **4058593869**

Option 2 ID : **4058593870**

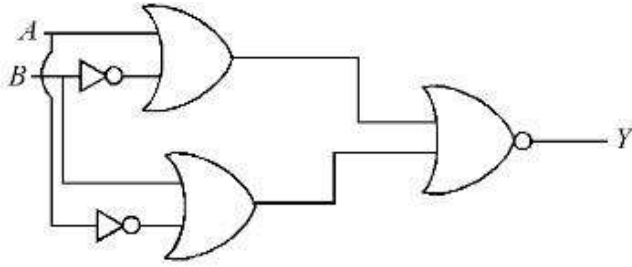
Option 3 ID : **4058593871**

Option 4 ID : **4058593872**

Status : **Not Answered**

Chosen Option : --

Q.37



The output of the given circuit diagram is -

Options

	A	B	Y
	0	0	0
1.	1	0	0
	0	1	0
	1	1	0

	A	B	Y
	0	0	0
2.	1	0	0
	0	1	0
	1	1	1

	A	B	Y
	0	0	0
3.	1	0	1
	0	1	1
	1	1	0

	A	B	Y
	0	0	0
4.	1	0	0
	0	1	1
	1	1	0

Question Type : **MCQ**Question ID : **4058591242**Option 1 ID : **4058593930**Option 2 ID : **4058593932**Option 3 ID : **4058593929**Option 4 ID : **4058593931**Status : **Not Answered**

Chosen Option : --

Q.38 The resistance per centimeter of a meter bridge wire is r , with $X \Omega$ resistance in left gap. Balancing length from left end is at 40 cm with 25Ω resistance in right gap. Now the wire is replaced by another wire of $2r$ resistance per centimeter. The new balancing length for same settings will be at

- Options
1. 10 cm
 2. 20 cm
 3. 40 cm
 4. 80 cm

Question Type : **MCQ**

Question ID : **4058591243**

Option 1 ID : **4058593935**

Option 2 ID : **4058593934**

Option 3 ID : **4058593936**

Option 4 ID : **4058593933**

Status : **Not Answered**

Chosen Option : --

Q.39 By what percentage will the illumination of the lamp decrease if the current drops by 20%?

- Options
1. 46%
 2. 26%
 3. 36%
 4. 56%

Question Type : **MCQ**

Question ID : **4058591235**

Option 1 ID : **4058593902**

Option 2 ID : **4058593904**

Option 3 ID : **4058593901**

Option 4 ID : **4058593903**

Status : **Not Answered**

Chosen Option : --

Q.40 Consider two physical quantities A and B related to each other as $E = \frac{B-x^2}{At}$ where E , x and t have dimensions of energy, length and time respectively. The dimension of AB is

- Options
1. $L^{-2}M^1T^0$
 2. $L^{-2}M^{-1}T^1$
 3. $L^2M^{-1}T^1$
 4. $L^0M^{-1}T^1$

Question Type : **MCQ**

Question ID : **4058591225**

Option 1 ID : **4058593863**

Option 2 ID : **4058593864**

Option 3 ID : **4058593862**

Option 4 ID : **4058593861**

Status : **Answered**

Chosen Option : **3**

Q.41 A gas mixture consists of 8 moles of argon and 6 moles of oxygen at temperature T . Neglecting all vibrational modes, the total internal energy of the system is:

- Options
1. 20 RT
 2. 29 RT
 3. 21 RT
 4. 27 RT

Question Type : **MCQ**

Question ID : **4058591233**

Option 1 ID : **4058593896**

Option 2 ID : **4058593895**

Option 3 ID : **4058593893**

Option 4 ID : **4058593894**

Status : **Not Answered**

Chosen Option : --

Q.42 A uniform magnetic field of $2 \times 10^{-3} T$ acts along positive Y -direction. A rectangular loop of sides 20 cm and 10 cm with current of 5 A is in Y - Z plane. The current is in anticlockwise sense with reference to negative X axis. Magnitude and direction of the torque is:

- Options
1. $2 \times 10^{-4} N\cdot m$ along positive X -direction
 2. $2 \times 10^{-4} N\cdot m$ along positive Y -direction
 3. $2 \times 10^{-4} N\cdot m$ along positive Z -direction
 4. $2 \times 10^{-4} N\cdot m$ along negative Z -direction

Question Type : **MCQ**

Question ID : **4058591236**

Option 1 ID : **4058593908**

Option 2 ID : **4058593907**

Option 3 ID : **4058593905**

Option 4 ID : **4058593906**

Status : **Answered**

Chosen Option : 4

Q.43 In a photoelectric effect experiment a light of frequency 1.5 times the threshold frequency is made to fall on the surface of photosensitive material. Now if the frequency is halved and intensity is doubled, the number of photo electrons emitted will be:

- Options
1. Zero
 2. doubled
 3. halved
 4. quadrupled

Question Type : **MCQ**

Question ID : **4058591240**

Option 1 ID : **4058593921**

Option 2 ID : **4058593923**

Option 3 ID : **4058593922**

Option 4 ID : **4058593924**

Status : **Answered**

Chosen Option : 1

Q.44 The speed of sound in oxygen at S.T.P. will be approximately:

(given, $R = 8.3 \text{ JK}^{-1}$, $\gamma = 1.4$)

- Options
1. 333 m/s
 2. 341 m/s
 3. 325 m/s
 4. 310 m/s

Question Type : **MCQ**

Question ID : **4058591232**

Option 1 ID : **4058593890**

Option 2 ID : **4058593889**

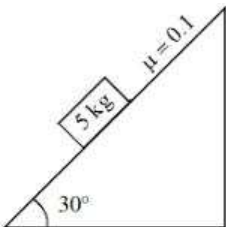
Option 3 ID : **4058593891**

Option 4 ID : **4058593892**

Status : **Not Answered**

Chosen Option : --

Q.45



A block of mass 5 kg is placed on a rough inclined surface as shown in the figure.

If \vec{F}_1 is the force required to just move the block up the inclined plane and \vec{F}_2 is the force required to just prevent the block from sliding down, then the value of

$|\vec{F}_1| - |\vec{F}_2|$ is: [Use $g = 10 \text{ m/s}^2$]

- Options
1. 10 N
 2. $\frac{5\sqrt{3}}{2} \text{ N}$
 3. $25\sqrt{3} \text{ N}$
 4. $50\sqrt{3} \text{ N}$

Question Type : **MCQ**

Question ID : **4058591228**

Option 1 ID : **4058593874**

Option 2 ID : **4058593873**

Option 3 ID : **4058593875**

Option 4 ID : **4058593876**

Status : **Not Answered**

Chosen Option : --

Q.46 A small spherical ball of radius r , falling through a viscous medium of negligible density has terminal velocity ' v '. Another ball of the same mass but of radius $2r$, falling through the same viscous medium will have terminal velocity:

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

Question Type : **MCQ**

Question ID : **4058591231**

Option 1 ID : **4058593886**

Option 2 ID : **4058593887**

Option 3 ID : **4058593885**

Option 4 ID : **4058593888**

Status : **Not Answered**

Chosen Option : --

Q.47 The mass number of nucleus having radius equal to half of the radius of nucleus with mass number 192 is:

- Options
1. 40
 2. 20
 3. 32
 4. 24

Question Type : **MCQ**

Question ID : **4058591241**

Option 1 ID : **4058593928**

Option 2 ID : **4058593925**

Option 3 ID : **4058593926**

Option 4 ID : **4058593927**

Status : **Answered**

Chosen Option : 4

Q.48 Given below are two statements:

Statement I: Electromagnetic waves carry energy as they travel through space and this energy is equally shared by the electric and magnetic fields.

Statement II: When electromagnetic waves strike a surface, a pressure is exerted on the surface.

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

Question Type : **MCQ**

Question ID : **4058591238**

Option 1 ID : **4058593913**

Option 2 ID : **4058593916**

Option 3 ID : **4058593915**

Option 4 ID : **4058593914**

Status : **Answered**

Chosen Option : 1

Q.49 The mass of the moon is $\frac{1}{144}$ times the mass of a planet and its diameter is $\frac{1}{16}$ times the diameter of a planet. If the escape velocity on the planet is v , the escape velocity on the moon will be :

- Options
1. $\frac{v}{4}$
 2. $\frac{v}{3}$
 3. $\frac{v}{6}$
 4. $\frac{v}{12}$

Question Type : **MCQ**

Question ID : **4058591230**

Option 1 ID : **4058593882**

Option 2 ID : **4058593884**

Option 3 ID : **4058593883**

Option 4 ID : **4058593881**

Status : **Not Answered**

Chosen Option : --

Q.50 When unpolarized light is incident at an angle of 60° on a transparent medium from air, the reflected ray is completely polarized. The angle of refraction in the medium is:

- Options
1. 90°
 2. 60°
 3. 30°
 4. 45°

Question Type : **MCQ**

Question ID : **4058591239**

Option 1 ID : **4058593920**

Option 2 ID : **4058593918**

Option 3 ID : **4058593917**

Option 4 ID : **4058593919**

Status : **Not Answered**

Chosen Option : --

Section : **Physics Section B**

Q.51 Two identical spheres each of mass 2 kg and radius 50 cm are fixed at the ends of a light rod so that the separation between the centers is 150 cm. Then, moment of inertia of the system about an axis perpendicular to the rod and passing through its middle point is $\frac{x}{20} \text{ kg m}^2$, where the value of x is _____.

Given --
Answer :

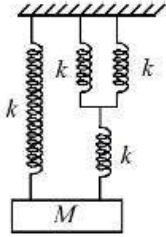
Question Type : **SA**

Question ID : **4058591246**

Status : **Not Answered**

Q.52 The time period of simple harmonic motion of mass M in the given figure is

$\pi\sqrt{\frac{\alpha M}{5k}}$, where the value of α is _____.



Given --
Answer :

Question Type : SA
Question ID : 4058591248
Status : Not Answered

Q.53 A body of mass ' m ' is projected with a speed ' u ' making an angle of 45° with the ground. The angular momentum of the body about the point of projection, at the highest point is expressed as $\frac{\sqrt{2}mu^3}{Xg}$. The value of ' X ' is _____.

Given --
Answer :

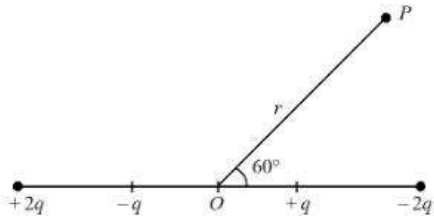
Question Type : SA
Question ID : 4058591245
Status : Not Answered

Q.54 Light from a point source in air falls on a convex curved surface of radius 20 cm and refractive index 1.5. If the source is located at 100 cm from the convex surface, the image will be formed at _____ cm from the object.

Given 37.5
Answer :

Question Type : SA
Question ID : 4058591253
Status : Answered

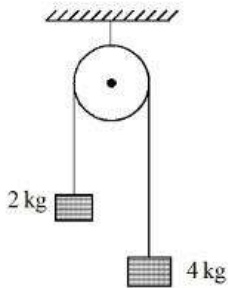
- Q.55** The distance between charges $+q$ and $-q$ is $2l$ and between $+2q$ and $-2q$ is $4l$. The electrostatic potential at point P at a distance r from center O is $-\alpha \left[\frac{ql}{r^2} \right] \times 10^9 V$, where the value of α is _____. (Use $\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$)



Given --
Answer :

Question Type : SA
Question ID : 4058591249
Status : Not Answered

- Q.56** Two blocks of mass 2 kg and 4 kg are connected by a metal wire going over a smooth pulley as shown in figure. The radius of wire is $4.0 \times 10^{-5} \text{ m}$ and Young's modulus of the metal is $2.0 \times 10^{11} \text{ N/m}^2$. The longitudinal strain developed in the wire is $\frac{1}{\alpha\pi}$. The value of α is _____. [Use $g = 10 \text{ m/s}^2$]



Given 16
Answer :

Question Type : SA
Question ID : 4058591247
Status : Answered

- Q.57** A nucleus has mass number A_1 and volume V_1 . Another nucleus has mass number A_2 and Volume V_2 . If relation between mass number is $A_2 = 4A_1$, then $\frac{V_2}{V_1} = \underline{\hspace{2cm}}$.

Given 4
Answer :

Question Type : SA
Question ID : 4058591254
Status : Answered

- Q.58** Two circular coils P and Q of 100 turns each have same radius of π cm. The currents in P and R are $1A$ and $2A$ respectively. P and Q are placed with their planes mutually perpendicular with their centers coincide. The resultant magnetic field induction at the center of the coils is $\sqrt{x} \text{ mT}$, where $x = \underline{\hspace{2cm}}$.

[Use $\mu_0 = 4\pi \times 10^{-7} \text{ TmA}^{-1}$]

Given --
Answer :

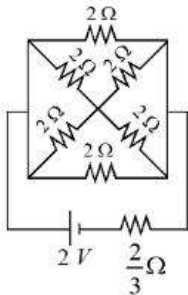
Question Type : **SA**
Question ID : **4058591251**
Status : **Not Answered**

- Q.59** The magnetic flux ϕ (in weber) linked with a closed circuit of resistance 8Ω varies with time (in seconds) as $\phi = 5t^2 - 36t + 1$. The induced current in the circuit at $t = 2$ s is $\underline{\hspace{2cm}}$ A.

Given 2
Answer :

Question Type : **SA**
Question ID : **4058591252**
Status : **Answered**

- Q.60** In the following circuit, the battery has an emf of $2V$ and an internal resistance of $\frac{2}{3} \Omega$. The power consumption in the entire circuit is $\underline{\hspace{2cm}}$ W.



Given --
Answer :

Question Type : **SA**
Question ID : **4058591250**
Status : **Not Answered**

Section : Chemistry Section A

Q.61 Match List I with List II

LIST I (Complex ion)		LIST II (Electronic Configuration)	
A.	$[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$	I.	$t_{2g}^2 e_g^0$
B.	$[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$	II.	$t_{2g}^3 e_g^0$
C.	$[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$	III.	$t_{2g}^3 e_g^2$
D.	$[\text{V}(\text{H}_2\text{O})_6]^{3+}$	IV.	$t_{2g}^6 e_g^2$

Choose the correct answer from the options given below:

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

Question Type : **MCQ**

Question ID : **4058591265**

Option 1 ID : **4058593994**

Option 2 ID : **4058593993**

Option 3 ID : **4058593992**

Option 4 ID : **4058593991**

Status : **Answered**

Chosen Option : **4**

Q.62 A sample of CaCO_3 and MgCO_3 weighed 2.21 g is ignited to constant weight of 1.152 g. The composition of mixture is :

(Given molar mass in g mol^{-1} CaCO_3 : 100, MgCO_3 : 84)

- Options
1. 1.023 g CaCO_3 + 1.187 g MgCO_3
 2. 1.023 g CaCO_3 + 1.023 g MgCO_3
 3. 1.187 g CaCO_3 + 1.023 g MgCO_3
 4. 1.187 g CaCO_3 + 1.187 g MgCO_3

Question Type : **MCQ**

Question ID : **4058591255**

Option 1 ID : **4058593951**

Option 2 ID : **4058593953**

Option 3 ID : **4058593952**

Option 4 ID : **4058593954**

Status : **Answered**

Chosen Option : **1**

Q.63 Choose the correct statements from the following

- A. All group 16 elements form oxides of general formula EO_2 and EO_3 , where $E = S, Se, Te$ and Po . Both the types of oxides are acidic in nature.
 B. TeO_2 is an oxidising agent while SO_2 is reducing in nature.
 C. The reducing property decreases from H_2S to H_2Te down the group.
 D. The ozone molecule contains five lone pairs of electrons.

Choose the correct answer from the options given below:

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

Question Type : **MCQ**

Question ID : **4058591262**

Option 1 ID : **4058593981**

Option 2 ID : **4058593979**

Option 3 ID : **4058593980**

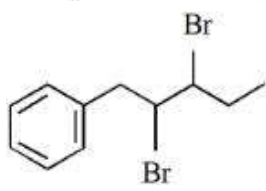
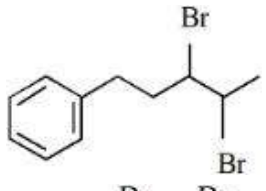
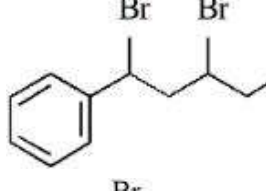
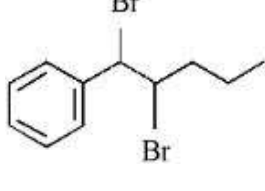
Option 4 ID : **4058593982**

Status : **Not Answered**

Chosen Option : --

Q.64 Identify structure of 2,3-dibromo-1-phenylpentane.

Options

1. 
2. 
3. 
4. 

Question Type : **MCQ**

Question ID : **4058591268**

Option 1 ID : **4058594005**

Option 2 ID : **4058594003**

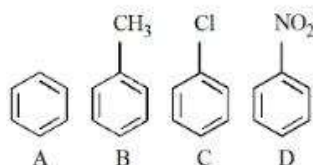
Option 3 ID : **4058594006**

Option 4 ID : **4058594004**

Status : **Answered**

Chosen Option : 1

Q.65 The correct order of reactivity in electrophilic substitution reaction of the following compounds is :



- Options 1. $B > A > C > D$
 2. $B > C > A > D$
 3. $D > C > B > A$
 4. $A > B > C > D$

Question Type : **MCQ**

Question ID : **4058591267**

Option 1 ID : **4058594002**

Option 2 ID : **4058594001**

Option 3 ID : **4058594000**

Option 4 ID : **4058593999**

Status : **Answered**

Chosen Option : **2**

Q.66 Given below are two statements :

Statement I : Group 13 trivalent halides get easily hydrolyzed by water due to their covalent nature.

Statement II : AlCl_3 upon hydrolysis in acidified aqueous solution forms octahedral $[\text{Al}(\text{H}_2\text{O})_6]^{3+}$ ion.

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

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

Question Type : **MCQ**

Question ID : **4058591261**

Option 1 ID : **4058593976**

Option 2 ID : **4058593975**

Option 3 ID : **4058593977**

Option 4 ID : **4058593978**

Status : **Not Answered**

Chosen Option : **--**

Q.67 Given below are two statements :

Statement I : S_8 solid undergoes disproportionation reaction under alkaline conditions to form S^{2-} and $S_2O_3^{2-}$.

Statement II : ClO_4^- can undergo disproportionation reaction under acidic condition.

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

- Options
1. Statement I is correct but statement II is incorrect
 2. Both statement I and statement II are correct
 3. Both statement I and statement II are incorrect
 4. Statement I is incorrect but statement II is correct

Question Type : **MCQ**

Question ID : **4058591259**

Option 1 ID : **4058593969**

Option 2 ID : **4058593967**

Option 3 ID : **4058593968**

Option 4 ID : **4058593970**

Status : **Not Answered**

Chosen Option : --

Q.68 Given below are two statements :

Statement I : Aniline reacts with con. H_2SO_4 , followed by heating at 453 - 473 K gives p-aminobenzene sulphonic acid, which gives blood red colour in the 'Lassaigne's test'.

Statement II : In Friedel - Craft's alkylation and acylation reactions, aniline forms salt with the $AlCl_3$ catalyst. Due to this, nitrogen of aniline acquires a positive charge and acts as deactivating group.

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

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

Question Type : **MCQ**

Question ID : **4058591273**

Option 1 ID : **4058594024**

Option 2 ID : **4058594025**

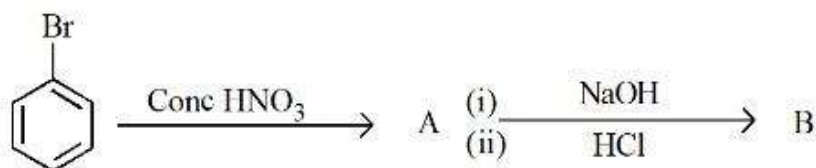
Option 3 ID : **4058594023**

Option 4 ID : **4058594026**

Status : **Answered**

Chosen Option : **3**

Q.69 Identify A and B in the following reaction sequence.



Options

1. A = B =
2. A = B =
3. A = B =
4. A = B =

Question Type : **MCQ**

Question ID : **4058591270**

Option 1 ID : **4058594012**

Option 2 ID : **4058594011**

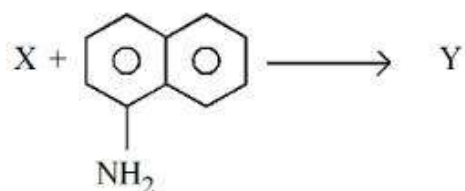
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Option 4 ID : **4058594014**

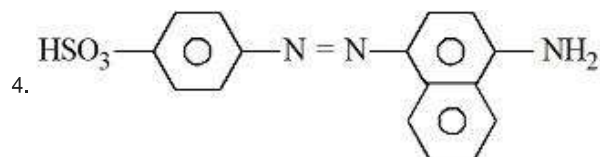
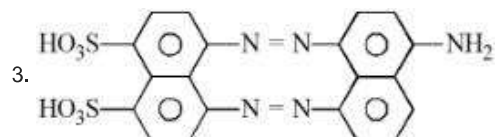
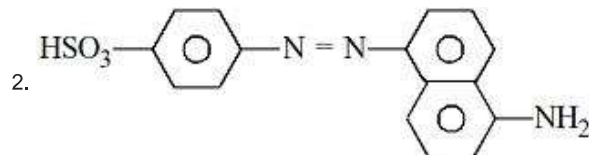
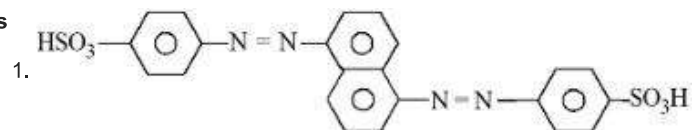
Status : **Answered**

Chosen Option : **3**

Q.70 The azo-dye (Y) formed in the following reactions is



Options



Question Type : **MCQ**

Question ID : **4058591274**

Option 1 ID : **4058594030**

Option 2 ID : **4058594028**

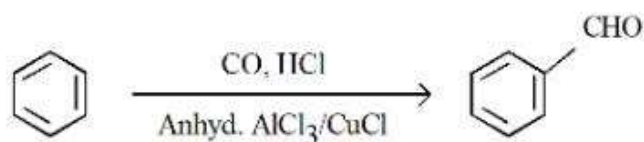
Option 3 ID : **4058594029**

Option 4 ID : **4058594027**

Status : **Answered**

Chosen Option : **4**

Q.71 Identify the name reaction.



- Options
1. Gatterman - Koch Reaction
 2. Stephen Reaction
 3. Etard Reaction
 4. Rosenmund Reduction

Question Type : **MCQ**

Question ID : **4058591272**

Option 1 ID : **4058594021**

Option 2 ID : **4058594020**

Option 3 ID : **4058594019**

Option 4 ID : **4058594022**

Status : **Answered**

Chosen Option : 1

Q.72 The four quantum numbers for the electron in the outer most orbital of potassium (atomic no. 19) are

- Options
1. $n = 4, l = 2, m = -1, s = +\frac{1}{2}$
 2. $n = 4, l = 0, m = 0, s = +\frac{1}{2}$
 3. $n = 2, l = 0, m = 0, s = +\frac{1}{2}$
 4. $n = 3, l = 0, m = 1, s = +\frac{1}{2}$

Question Type : **MCQ**

Question ID : **4058591256**

Option 1 ID : **4058593958**

Option 2 ID : **4058593957**

Option 3 ID : **4058593955**

Option 4 ID : **4058593956**

Status : **Answered**

Chosen Option : 2

Q.73 The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is -

- Options
1. distillation
 2. distillation under reduced pressure
 3. steam distillation
 4. crystallisation

Question Type : **MCQ**

Question ID : **4058591266**

Option 1 ID : **4058593995**

Option 2 ID : **4058593997**

Option 3 ID : **4058593998**

Option 4 ID : **4058593996**

Status : **Not Answered**

Chosen Option : --

Q.74 Select the option with correct property -

- Options
1. $[\text{Ni}(\text{CO})_4]$ Diamagnetic, $[\text{NiCl}_4]^{2-}$ Paramagnetic
 2. $[\text{Ni}(\text{CO})_4]$ and $[\text{NiCl}_4]^{2-}$ both Diamagnetic
 3. $[\text{Ni}(\text{CO})_4]$ and $[\text{NiCl}_4]^{2-}$ both Paramagnetic
 4. $[\text{NiCl}_4]^{2-}$ Diamagnetic, $[\text{Ni}(\text{CO})_4]$ Paramagnetic

Question Type : **MCQ**

Question ID : **4058591264**

Option 1 ID : **4058593988**

Option 2 ID : **4058593989**

Option 3 ID : **4058593990**

Option 4 ID : **4058593987**

Status : **Answered**

Chosen Option : 1

Q.75 $A_{(g)} \rightleftharpoons B_{(g)} + \frac{C}{2}_{(g)}$ The correct relationship between K_p , α and equilibrium pressure P is

Options

1. $K_p = \frac{\alpha^{1/2} P^{3/2}}{(2 + \alpha)^{3/2}}$

2. $K_p = \frac{\alpha^{3/2} P^{1/2}}{(2 + \alpha)^{1/2} (1 - \alpha)}$

3. $K_p = \frac{\alpha^{1/2} P^{1/2}}{(2 + \alpha)^{1/2}}$

4. $K_p = \frac{\alpha^{1/2} P^{1/2}}{(2 + \alpha)^{3/2}}$

Question Type : **MCQ**

Question ID : **4058591258**

Option 1 ID : **4058593966**

Option 2 ID : **4058593963**

Option 3 ID : **4058593964**

Option 4 ID : **4058593965**

Status : **Not Answered**

Chosen Option : --

Q.76 Choose the correct statements from the following

A. Mn_2O_7 is an oil at room temperature

B. V_2O_4 reacts with acid to give VO_2^{2+}

C. CrO is a basic oxide

D. V_2O_5 does not react with acid

Choose the correct answer from the options given below :

Options 1. A and C only

2. B and C only

3. A, B and D only

4. A, B and C only

Question Type : **MCQ**

Question ID : **4058591263**

Option 1 ID : **4058593986**

Option 2 ID : **4058593983**

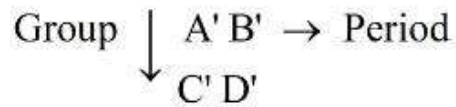
Option 3 ID : **4058593985**

Option 4 ID : **4058593984**

Status : **Answered**

Chosen Option : 1

Q.77 Consider the following elements.



Which of the following is/are true about A', B', C' and D'?

- A. Order of atomic radii: $B' < A' < D' < C'$
- B. Order of metallic character: $B' < A' < D' < C'$
- C. Size of the element: $D' < C' < B' < A'$
- D. Order of ionic radii: $B'^+ < A'^+ < D'^+ < C'^+$

Choose the correct answer from the options given below :

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

Question Type : **MCQ**

Question ID : **4058591260**

Option 1 ID : **4058593972**

Option 2 ID : **4058593973**

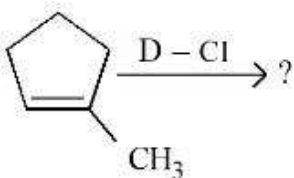
Option 3 ID : **4058593971**

Option 4 ID : **4058593974**

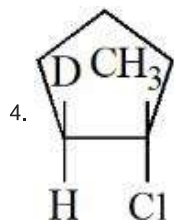
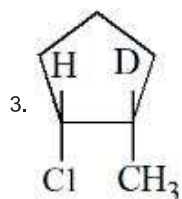
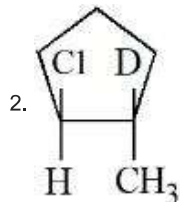
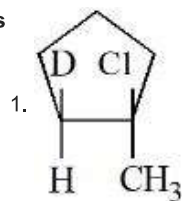
Status : **Answered**

Chosen Option : **3**

Q.78 Major product of the following reaction is -



Options



Question Type : MCQ

Question ID : 4058591269

Option 1 ID : 4058594008

Option 2 ID : 4058594010

Option 3 ID : 4058594009

Option 4 ID : 4058594007

Status : Answered

Chosen Option : 1

Q.79 Which of the following is least ionic?

- Options
1. KCl
 2. BaCl₂
 3. CoCl₂
 4. AgCl

Question Type : **MCQ**

Question ID : **4058591257**

Option 1 ID : **4058593959**

Option 2 ID : **4058593961**

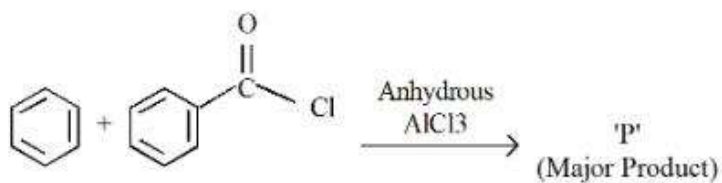
Option 3 ID : **4058593962**

Option 4 ID : **4058593960**

Status : **Answered**

Chosen Option : **2**

Q.80 Identify major product 'P' formed in the following reaction.



Options

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

Question Type : **MCQ**

Question ID : **4058591271**

Option 1 ID : **4058594016**

Option 2 ID : **4058594015**

Option 3 ID : **4058594017**

Option 4 ID : **4058594018**

Status : **Answered**

Chosen Option : **1**

Section : **Chemistry Section B**

Q.81 The values of conductivity of some materials at 298.15 K in Sm^{-1} are 2.1×10^3 , 1.0×10^{-16} , 1.2×10 , 3.91, 1.5×10^{-2} , 1×10^{-7} , 1.0×10^3 . The number of conductors among the materials is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591278
Status : Not Answered

Q.82 If 5 moles of an ideal gas expands from 10 L to a volume of 100 L at 300 K under isothermal and reversible condition then work, w, is $-x$ J. The value of x is _____.

(Given $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

Given --
Answer :

Question Type : SA
Question ID : 4058591276
Status : Not Answered

Q.83 A diatomic molecule has a dipole moment of 1.2 D. If the bond distance is 1 \AA , then fractional charge on each atom is _____ $\times 10^{-1}$ esu.

(Given $1 \text{ D} = 10^{-18} \text{ esucm}$)

Given --
Answer :

Question Type : SA
Question ID : 4058591275
Status : Not Answered

Q.84 In the reaction of potassium dichromate, potassium chloride and sulfuric acid (conc.), the oxidation state of the chromium in the product is (+)_____.

Given 6
Answer :

Question Type : SA
Question ID : 4058591284
Status : Answered

Q.85 $r = k[A]$ for a reaction, 50% of A is decomposed in 120 minutes. The time taken for 90% decomposition of A is _____ minutes.

Given 398.6
Answer :

Question Type : SA
Question ID : 4058591279
Status : Answered

Q.86 A compound (x) with molar mass 108 g mol^{-1} undergoes acetylation to give product with molar mass 192 g mol^{-1} . The number of amino groups in the compound (x) is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591282
Status : Not Answered

Q.87 From the vitamins A, B₁, B₆, B₁₂, C, D, E and K, the number of vitamins that can be stored in our body is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591283
Status : Not Answered

Q.88 Number of moles of H⁺ ions required by 1 mole of MnO₄⁻ to oxidise oxalate ion to CO₂ is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591280
Status : Not Answered

Q.89 The molarity of 1 L orthophosphoric acid (H₃PO₄) having 70% purity by weight (specific gravity 1.54 g cm^{-3}) is _____ M.
(Molar mass of H₃PO₄ = 98 g mol^{-1})

Given --
Answer :

Question Type : SA
Question ID : 4058591277
Status : Not Answered

Q.90 Number of isomeric products formed by monochlorination of 2-methylbutane in presence of sunlight is _____.

Given 4
Answer :

Question Type : SA
Question ID : 4058591281
Status : Answered