NTA JEE Mains Apr 2026 Paper I

Section : **Mathematics Section A**

Q.1 If the mean of the data

Class	5-10	10-15	15-20	20-25	25-30	30-35
Frequency	2	k	28	54	k+1	5

is 21, then k is one of the roots of the equation :

Options

1. $2x^2-35x+98=0$
2. $2x^2-23x-10=0$
3. $2x^2-19x-10=0$
4. $4x^2-35x+24=0$

Question Type : **MCQ**
Question ID : **6911218**
Option 1 ID : **69112132**
Option 2 ID : **69112129**
Option 3 ID : **69112131**
Option 4 ID : **69112130**
Status : **Answered**
Chosen Option : **3**

Q.2

Let a line L passing through the point (1, 1, 1) be perpendicular to both the vectors $2\hat{i}+2\hat{j}+\hat{k}$ and $\hat{i}+2\hat{j}+2\hat{k}$. If P(a, b, c) is the foot of perpendicular from the origin on the line L, then the value of $34(a+b+c)$ is :

Options

1. 100
2. 50
3. 80
4. 120

Question Type : **MCQ**
Question ID : **69112115**
Option 1 ID : **69112159**
Option 2 ID : **69112157**
Option 3 ID : **69112158**
Option 4 ID : **69112160**
Status : **Answered**
Chosen Option : **1**

Q.3

Let an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, a < b, pass through the point (4, 3) and have eccentricity $\frac{\sqrt{5}}{3}$. Then the length of its latus rectum is :

Options

1. $2\sqrt{5}$
2. $\frac{7\sqrt{5}}{3}$
3. $\frac{8\sqrt{5}}{3}$
4. $\frac{4\sqrt{5}}{3}$

Question Type : **MCQ**
Question ID : **69112110**
Option 1 ID : **69112138**
Option 2 ID : **69112139**
Option 3 ID : **69112140**
Option 4 ID : **69112137**
Status : **Answered**
Chosen Option : **3**

Q.4

Let $A=\begin{bmatrix}1 & 2\\ 1 & \alpha\end{bmatrix}$ and $B=\begin{bmatrix}3 & 3\\ \beta & 2\end{bmatrix}$. If $A^2-4A+I=O$ and $B^2-5B-6I=O$, then among the two statements :

(S1): $[(B-A)(B+A)]^T=\begin{bmatrix}13 & 15\\ 7 & 10\end{bmatrix}$

and

(S2): $\det(\text{adj}(A+B))=-5$,

Options

1. both (S1) and (S2) are wrong
2. only (S2) is correct
3. only (S1) is correct
4. both (S1) and (S2) are correct

Question Type : **MCQ**
Question ID : **6911214**
Option 1 ID : **69112116**
Option 2 ID : **69112114**
Option 3 ID : **69112113**
Option 4 ID : **69112115**
Status : **Answered**
Chosen Option : **2**

Q.5

If the curve $y=f(x)$ passes through the point (1, e) and satisfies the differential equation $dy=y(2+\log_e x)\,dx$, $x>0$, then $f(e)$ is equal to :

Options

1. e^{2e}
2. e^{e^2}
3. e^{2^e}
4. e^e

Question Type : **MCQ**
Question ID : **69112117**
Option 1 ID : **69112167**
Option 2 ID : **69112166**
Option 3 ID : **69112168**
Option 4 ID : **69112165**
Status : **Answered**
Chosen Option : **1**

Q.6

Let the mid points of the sides of a triangle ABC be $\left(\frac{5}{2}, 7\right)$, $\left(\frac{5}{2}, 3\right)$ and (4, 5). If its incentre is (h, k), then $3h + k$ is equal to :

Options

1. 13
2. 11
3. 12
4. 14

Question Type : **MCQ**
Question ID : **6911219**
Option 1 ID : **69112135**
Option 2 ID : **69112133**
Option 3 ID : **69112134**
Option 4 ID : **69112136**
Status : **Answered**
Chosen Option : **1**

Q.7

If the point of intersection of the lines $\frac{x+1}{3} = \frac{y+a}{5} = \frac{z+b+1}{7}$ and $\frac{x-2}{1} = \frac{y-b}{4} = \frac{z-2a}{7}$ lies on xy-plane, then the value of $a + b$ is :

Options

1. 2
2. 9
3. 5
4. 7

Question Type : **MCQ**
Question ID : **69112113**
Option 1 ID : **69112149**
Option 2 ID : **69112152**
Option 3 ID : **69112150**
Option 4 ID : **69112151**
Status : **Answered**
Chosen Option : **4**

Q.8

Let $[\cdot]$ denote the greatest integer function. Then the value of $\int_0^3 \left(\frac{e^x + e^{-x}}{[x]!}\right) dx$ is :

Options

1. $\frac{1}{2}\left(e^2 + e^3 - \frac{1}{e^2} - \frac{1}{e^3}\right)$

2. $e^2 + e^3 - \frac{1}{e^2} - \frac{1}{e^3}$

3. $e^2 + e^3 - \frac{1}{2e^2} - \frac{1}{2e^3}$

4. $\frac{1}{2}(e^2 + e^3) - \frac{1}{e^2} - \frac{1}{e^3}$

Question Type : **MCQ**
Question ID : **69112119**
Option 1 ID : **69112174**
Option 2 ID : **69112173**
Option 3 ID : **69112175**
Option 4 ID : **69112176**
Status : **Answered**
Chosen Option : **1**

Q.9 Let $y = y(x)$ be the solution curve of the differential equation $(1 + \sin x)\frac{dy}{dx} + (y+1)\cos x = 0, y(0) = 0$. If the curve $y = y(x)$ passes through the point $\left(\alpha, \frac{-1}{2}\right)$, then a value of α is :

Options

1. $\frac{\pi}{4}$
2. $\frac{\pi}{3}$
3. $\frac{\pi}{6}$
4. $\frac{\pi}{2}$

Question Type : **MCQ**
Question ID : **69112120**
Option 1 ID : **69112178**
Option 2 ID : **69112179**
Option 3 ID : **69112177**
Option 4 ID : **69112180**
Status : **Answered**
Chosen Option : **4**

Q.10 If $\lim\limits_{x\to 2} \frac{\sin\left(x^3 - 5x^2 + ax + b\right)}{\left(\sqrt{x-1} - 1\right)\log_e(x-1)} = m$, then $a + b + m$ is equal to :

Options

1. 6
2. 8
3. 5
4. 10

Question Type : **MCQ**
Question ID : **69112116**
Option 1 ID : **69112162**
Option 2 ID : **69112163**
Option 3 ID : **69112161**
Option 4 ID : **69112164**
Status : **Answered**
Chosen Option : **3**

Q.11 Let $S=\{x\in[-\pi,\pi]:\sin x\,(\sin x+\cos x)=a,\ a\in Z\}$. Then n(S) is equal to :

Options

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

Question Type : **MCQ**
Question ID : **69112112**
Option 1 ID : **69112148**
Option 2 ID : **69112147**
Option 3 ID : **69112145**
Option 4 ID : **69112146**
Status : **Answered**
Chosen Option : **1**

Q.12 If $\sin\left(\frac{\pi}{18}\right)\sin\left(\frac{5\pi}{18}\right)\sin\left(\frac{7\pi}{18}\right)=K$, then the value of $\sin\left(\frac{10K\pi}{3}\right)$ is :

Options

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

Question Type : **MCQ**
Question ID : **69112111**
Option 1 ID : **69112143**
Option 2 ID : **69112142**
Option 3 ID : **69112144**
Option 4 ID : **69112141**
Status : **Answered**
Chosen Option : **4**

Q.13 The number of seven-digit numbers, that can be formed by using the digits 1, 2, 3, 5 and 7 such that each digit is used at least once, is :

Options

1. 15400
2. 16800
3. 29400
4. 17800

Question Type : **MCQ**
Question ID : **6911216**
Option 1 ID : **69112121**
Option 2 ID : **69112123**
Option 3 ID : **69112124**
Option 4 ID : **69112122**
Status : **Answered**
Chosen Option : **3**

Q.14 Let x and y be real numbers such that $50\left(\frac{2x}{1+3i} - \frac{y}{1-2i}\right) = 31 + 17i$, $i = \sqrt{-1}$. Then the value of $10(x-3y)$ is :

Options

1. 75
2. 31
3. 35
4. 20

Question Type : **MCQ**
Question ID : **6911212**
Option 1 ID : **6911218**
Option 2 ID : **6911216**
Option 3 ID : **6911217**
Option 4 ID : **6911215**
Status : **Answered**
Chosen Option : **1**

Q.15 Let A be the set of first 101 terms of an A.P., whose first term is 1 and the common difference is 5 and let B be the set of first 71 terms of an A.P., whose first term is 9 and the common difference is 7. Then the number of elements in $A \cap B$, which are divisible by 3, is :

Options

1. 7
2. 4
3. 6
4. 5

Question Type : **MCQ**
Question ID : **6911215**
Option 1 ID : **69112120**
Option 2 ID : **69112117**
Option 3 ID : **69112119**
Option 4 ID : **69112118**
Status : **Answered**
Chosen Option : **4**

Q.16 Let $\alpha, \alpha+2, \alpha \in \mathbf{Z}$, be the roots of the quadratic equation
$x(x+2)+(x+1)(x+3)+(x+2)(x+4)+\ldots.+(x+n-1)(x+n+1)=4n$ for some $n \in \mathbf{N}$.
Then $n+\alpha$ is equal to :

Options

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

Question Type : **MCQ**
Question ID : **6911211**
Option 1 ID : **6911213**
Option 2 ID : **6911212**
Option 3 ID : **6911214**
Option 4 ID : **6911211**
Status : **Answered**
Chosen Option : **1**

Q.17

The number of critical points of the function $f(x) = \begin{cases} \left|\frac{\sin x}{x}\right| & , x \neq 0 \\ 1 & , x = 0 \end{cases}$ in the interval $(-2\pi, 2\pi)$ is equal to :

Options

1. 5
2. 1
3. 7
4. 3

Question Type : **MCQ**
Question ID : **69112118**
Option 1 ID : **69112171**
Option 2 ID : **69112169**
Option 3 ID : **69112172**
Option 4 ID : **69112170**
Status : **Answered**
Chosen Option : **4**

Q.18

If $\vec{a}$ and $\vec{b}$ are two vectors such that $|\vec{a}| = 2$ and $|\vec{b}| = 3$, then the maximum value of $3\left|\left(3\vec{a} + 2\vec{b}\right)\right| + 4\left|\left(3\vec{a} - 2\vec{b}\right)\right|$ is :

Options

1. 30
2. 72
3. 60
4. 36

Question Type : **MCQ**
Question ID : **69112114**
Option 1 ID : **69112153**
Option 2 ID : **69112156**
Option 3 ID : **69112155**
Option 4 ID : **69112154**
Status : **Answered**
Chosen Option : **3**

Q.19

The number of elements in the set $S = \left\{(r, k) : k \in \mathbf{Z} \text{ and } {}^{36}C_{r+1} = \frac{6\left({}^{35}C_r\right)}{\left(k^2-3\right)}\right\}$, is :

Options

1. 2
2. 16
3. 8
4. 4

Question Type : **MCQ**
Question ID : **6911217**
Option 1 ID : **69112125**
Option 2 ID : **69112128**
Option 3 ID : **69112127**
Option 4 ID : **69112126**
Status : **Answered**
Chosen Option : **4**

Q.20

Let $\alpha, \beta \in \mathbf{R}$ be such that the system of linear equations

$$x + 2y + z = 5$$
$$2x + y + \alpha z = 5$$
$$8x + 4y + \beta z = 18$$

has no solution. Then $\frac{\beta}{\alpha}$ is equal to :

Options

1. -4
2. 4
3. 8
4. -8

Question Type : **MCQ**
Question ID : **6911213**
Option 1 ID : **6911219**
Option 2 ID : **69112110**
Option 3 ID : **69112111**
Option 4 ID : **69112112**
Status : **Answered**
Chosen Option : **2**

Section : **Mathematics Section B**

Q.21 Let a, b, c $\in \{1, 2, 3, 4\}$. If the probability, that $ax^2 + 2\sqrt{2}bx + c > 0$ for all $x \in \mathbf{R}$, is $\frac{m}{n}$, gcd(m, n) = 1, then m + n is equal to _____.

Given **19**
Answer :

Question Type : **SA**
Question ID : **69112123**
Status : **Answered**

Q.22 If $\sum_{k=1}^{n} a_k = 6n^3$, then $\sum_{k=1}^{6} \left(\frac{a_{k+1} - a_k}{36}\right)^2$ is equal to _____.

Given **91**
Answer :

Question Type : **SA**
Question ID : **69112122**
Status : **Answered**

Q.23 If the domain of the function $f(x) = \sqrt{\log_{(0.6)}\left(\left|\frac{2x-5}{x^2-4}\right|\right)}$ is $(-\infty, a] \cup \{b\} \cup [c, d) \cup (e, \infty)$, then the value of a + b + c + d + e is _____.

Given **1.50**
Answer :

Question Type : **SA**
Question ID : **69112121**
Status : **Answered**

Q.24 Let a circle C have its centre in the first quadrant, intersect the coordinate axes at exactly three points and cut off equal intercepts from the coordinate axes. If the length of the chord of C on the line $x + y = 1$ is $\sqrt{14}$, then the square of the radius of C is _____.

Given **8**
Answer :

Question Type : **SA**
Question ID : **69112124**
Status : **Answered**

Q.25

If $\alpha = \int_0^{2\sqrt{3}} \log_2\left(x^2+4\right)dx + \int_2^4 \sqrt{2^x-4}\,dx$, then α^2 is equal to _____.

Given **192**
Answer :

Question Type : **SA**
Question ID : **69112125**
Status : **Answered**

Section : **Physics Section A**

Q.26 Heat is supplied to a diatomic gas at constant pressure. Then the ratio of $\Delta Q : \Delta U : \Delta W$ is _____.

Options

1. $2:5:7$
2. $7:5:2$
3. $5:3:2$
4. $2:3:5$

Question Type : **MCQ**
Question ID : **69112133**
Option 1 ID : **691121116**
Option 2 ID : **691121117**
Option 3 ID : **691121115**
Option 4 ID : **691121114**
Status : **Answered**
Chosen Option : **2**

Q.27 For a certain metal, when monochromatic light of wavelength λ is incident, the stopping potential for photoelectrons is $3V_o$. When the same metal is illuminated by light of wavelength 2λ, then the stopping potential becomes V_o. The threshold wavelength for photoelectric emission for the given metal is αλ. The value of α is _____.

Options

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

Question Type : **MCQ**
Question ID : **69112142**
Option 1 ID : **691121151**
Option 2 ID : **691121152**
Option 3 ID : **691121153**
Option 4 ID : **691121150**
Status : **Answered**
Chosen Option : **1**

Q.28 A particle is rotating in a circular path and at any instant its motion can be described as $\theta = \frac{5t^4}{40} - \frac{t^3}{3}$. The angular acceleration of the particle after 10 seconds is _____ rad/s^2.

Options

1. 150
2. 120
3. 130
4. 170

Question Type : **MCQ**
Question ID : **69112131**
Option 1 ID : **691121106**
Option 2 ID : **691121107**
Option 3 ID : **691121108**
Option 4 ID : **691121109**
Status : **Answered**
Chosen Option : **3**

Q.29 Two charged conducting spheres S_1 and S_2 of radii 8 cm and 18 cm are connected to each other by a wire. After equilibrium is established, the ratio of electric fields on S_1 and S_2 spheres are E_{S1} and E_{S2} respectively. The value of $\frac{E_{S1}}{E_{S2}}$ is _____.

Options

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

Question Type : **MCQ**
Question ID : **69112134**
Option 1 ID : **691121118**
Option 2 ID : **691121121**
Option 3 ID : **691121120**
Option 4 ID : **691121119**
Status : **Answered**
Chosen Option : **2**

Q.30 Angular momentum of an electron in a hydrogen atom is $\frac{3h}{\pi}$, then the energy of the electron is _____ eV.

Options

1. -0.85
2. -0.38
3. -1.51
4. -0.28

Question Type : **MCQ**
Question ID : **69112144**
Option 1 ID : **691121159**
Option 2 ID : **691121160**
Option 3 ID : **691121158**
Option 4 ID : **691121161**
Status : **Answered**
Chosen Option : **2**

Q.31 The velocity of a particle is given as $\vec{v} = -x\hat{i} + 2y\hat{j} - z\hat{k}$ m/s. The magnitude of acceleration at point (1, 2, 4) is _____ m/s^2.

Options

1. 0
2. $\sqrt{6}$
3. 9
4. $\sqrt{33}$

Question Type : **MCQ**
Question ID : **69112128**
Option 1 ID : **69112197**
Option 2 ID : **69112194**
Option 3 ID : **69112195**
Option 4 ID : **69112196**
Status : **Answered**
Chosen Option : **3**

Q.32 When a coil is placed in a time dependent magnetic field the power dissipated in it is P. The number of turns, area of the coil and radius of the coil wire are N, A and r respectively. For a second coils number of turns, area of the coil and radius of the coil wire are $2N$, $2A$ and $3r$ respectively. When the first coil is replaced with second coil the power dissipated in it is $\sqrt{2}\,\alpha P$. The value of α is _____.

Options

1. 36
2. $128\sqrt{2}$
3. 64
4. 16

Question Type : **MCQ**
Question ID : **69112138**
Option 1 ID : **691121134**
Option 2 ID : **691121135**
Option 3 ID : **691121137**
Option 4 ID : **691121136**
Status : **Not Answered**
Chosen Option : **--**

Q.33 The position of an object having mass 0.1 kg as a function of time t is given as $\vec{r} = \left(10t^2\,\hat{i} + 5t^3\,\hat{j}\right)$ m. At $t = 1$ s, which of the following statements are **correct** ?

A. The linear momentum $\vec{p} = \left(2\hat{i} + 1.5\hat{j}\right)$ kg·m/s.

B. The force acting on the object $\vec{F} = \left(2\hat{i} + 3\hat{j}\right)$N.

C. The angular momentum of the object about its origin $\vec{L} = 15\ \hat{k}$ Js.

D. The torque acting on the object about its origin $\vec{\tau} = 20\ \hat{k}$ Nm.

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

Options

1. A, B and D only

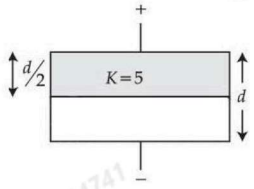
2. A, B and C only

3. B, C and D only

4. A, C and D only

Question Type : **MCQ**
Question ID : **69112129**
Option 1 ID : **691121101**
Option 2 ID : **69112198**
Option 3 ID : **69112199**
Option 4 ID : **691121100**
Status : **Answered**
Chosen Option : **1**

Q.34 A parallel plate air capacitor has a capacitance C. When it is half filled as show in figure with a dielectric constant $K=5$, the percentage increase in the capacitance is _____.



Options

1. 400
2. 33.34
3. 66.67
4. 200

Question Type : **MCQ**
Question ID : **69112132**
Option 1 ID : **691121113**
Option 2 ID : **691121110**
Option 3 ID : **691121111**
Option 4 ID : **691121112**
Status : **Answered**
Chosen Option : **3**

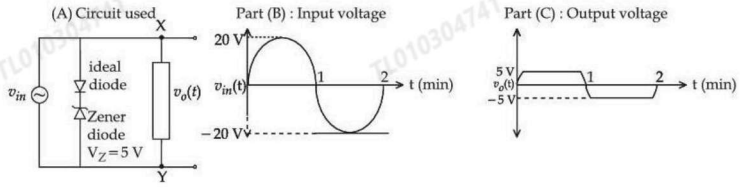
Q.35 The diameter of a wire measured by a screw gauge of least count 0.001 cm is 0.08 cm. The length measured by a scale of least count 0.1 cm is 150 cm. When a weight of 100 N is applied to the wire, the extension in length is 0.5 cm, measured by a micrometer of least count 0.001 cm. The error in the measured Young's modulus is $\alpha \times 10^9$ N/m^2. The value of α is _____.
(Ignore the contribution of the load to Young's modulus error calculation)

Options

1. 1.65
2. 0.13
3. 1.3
4. 0.25

Question Type : **MCQ**
Question ID : **69112127**
Option 1 ID : **69112191**
Option 2 ID : **69112192**
Option 3 ID : **69112190**
Option 4 ID : **69112193**
Status : **Answered**
Chosen Option : **1**

Q.36 For the given circuit (shown in part (A)) the time dependent input voltage $v_{in}(t)$ and corresponding output $v_o(t)$ are shown in part (B) and part (C), respectively. Identify the components that are used in the circuit between points X and Y.



Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **69112137**
Option 1 ID : **691121131**
Option 2 ID : **691121132**
Option 3 ID : **691121130**
Option 4 ID : **691121133**
Status : **Not Answered**
Chosen Option : **--**

Q.37 For a thin symmetric prism made of glass (refractive index 1.5), the ratio of incident angle and minimum deviation will be _____.

Options

1. 1 : 2
2. 3 : 4
3. 3 : 2
4. 2 : 1

Question Type : **MCQ**
Question ID : **69112140**
Option 1 ID : **691121145**
Option 2 ID : **691121142**
Option 3 ID : **691121143**
Option 4 ID : **691121144**
Status : **Answered**
Chosen Option : **3**

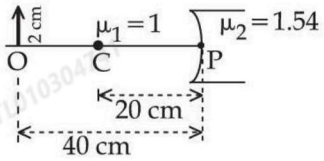
Q.38 A planet (P_1) is moving around the star of mass $2M$ in the orbit of radius R. Another planet (P_2) is moving around another star of mass $4M$ in a orbit of radius $2R$. Ratio of time periods of revolution of P_2 and P_1 is _____.

Options

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

Question Type : **MCQ**
Question ID : **69112130**
Option 1 ID : **691121102**
Option 2 ID : **691121103**
Option 3 ID : **691121104**
Option 4 ID : **691121105**
Status : **Answered**
Chosen Option : **2**

Q.39 Refer the figure given below. μ_1 and μ_2 are refractive indices of air and lens material. The height of image will be _____ cm.



Options

1. 0.5
2. 1.2
3. 1
4. 0.25

Question Type : **MCQ**
Question ID : **69112141**
Option 1 ID : **691121147**
Option 2 ID : **691121148**
Option 3 ID : **691121146**
Option 4 ID : **691121149**
Status : **Answered**
Chosen Option : **1**

Q.40 The equation of a plane progressive wave is given by $y = 5\cos\pi\left(200\,t - \frac{x}{150}\right)$ where x and y are in cm and t is in second. The velocity of the wave is _____ m/s.

Options

1. 300
2. 120
3. 150
4. 200

Question Type : **MCQ**
Question ID : **69112135**
Option 1 ID : **691121125**
Option 2 ID : **691121122**
Option 3 ID : **691121123**
Option 4 ID : **691121124**
Status : **Answered**
Chosen Option : **1**

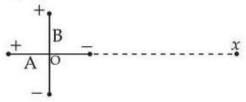
Q.41 An electromagnetic wave travelling in x-direction is described by field equation $E_y = 300\,\sin\omega\left(t - \frac{x}{c}\right)$. If the electron is restricted to move in y-direction only with speed of 1.5×10^6 m/s then ratio of maximum electric and magnetic forces acting on the electron is _____.

Options

1. 200
2. 400
3. 300
4. 150

Question Type : **MCQ**
Question ID : **69112143**
Option 1 ID : **691121154**
Option 2 ID : **691121156**
Option 3 ID : **691121157**
Option 4 ID : **691121155**
Status : **Answered**
Chosen Option : **1**

Q.42 Two short electric dipoles *A* and *B* having dipole moment p_1 and p_2 respectively are placed with their axis mutually perpendicular as shown in the figure. The resultant electric field at a point *x* is making an angle of 60° with the line joining points O and *x*. The ratio of the dipole moments p_2/p_1 is _____.

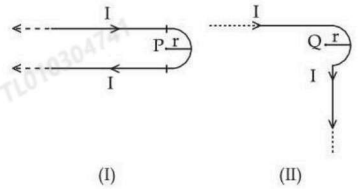


Options

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

Question Type : **MCQ**
Question ID : **69112136**
Option 1 ID : **691121126**
Option 2 ID : **691121128**
Option 3 ID : **691121129**
Option 4 ID : **691121127**
Status : **Answered**
Chosen Option : **4**

Q.43 Two identical long current carrying wires are bent into the shapes shown in the following figures. If the magnitude of magnetic fields at the centres P and Q of a semicircular arc are B_1 and B_2 respectively, then the ratio $\frac{B_1}{B_2}$ is _____.



(I) (II)

Options

1. $\frac{2+\pi}{1-\pi}$

2. $\frac{1+\pi}{1-\pi}$

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

4. $\frac{1+\pi}{2-\pi}$

Question Type : **MCQ**
Question ID : **69112139**
Option 1 ID : **691121140**
Option 2 ID : **691121139**
Option 3 ID : **691121138**
Option 4 ID : **691121141**
Status : **Answered**
Chosen Option : **3**

Q.44 A liquid drop of diameter 2 mm breaks into 512 droplets. The change in surface energy is $\alpha \times 10^{-6}$ J. The value of α is _____. (Take surface tension of liquid = 0.08 N/m)

Options

1. 7
2. 10
3. 8
4. 11

Question Type : **MCQ**
Question ID : **69112145**
Option 1 ID : **691121163**
Option 2 ID : **691121162**
Option 3 ID : **691121164**
Option 4 ID : **691121165**
Status : **Answered**
Chosen Option : **1**

Q.45 The dimensional formula of $\frac{1}{2}\epsilon_o E^2$ (ϵ_o = permittivity of vacuum and E = electric field) is $M^aL^bT^c$.

The value of $2a - b + c =$ _____.

Options

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

Question Type : **MCQ**
Question ID : **69112126**
Option 1 ID : **69112188**
Option 2 ID : **69112187**
Option 3 ID : **69112186**
Option 4 ID : **69112189**
Status : **Answered**
Chosen Option : **2**

Section : **Physics Section B**

Q.46 1 μC charge moving with velocity $\vec{v} = \left(\hat{i} - 2\hat{j} + 3\hat{k}\right)$ m/s in the region of magnetic field $\vec{B} = \left(2\hat{i} + 3\hat{j} - 5\hat{k}\right)$ T. The magnitude of force acting on it is $\sqrt{\alpha} \times 10^{-6}$ N. The value of α is _____.

Given **171**
Answer :

Question Type : **SA**
Question ID : **69112148**
Status : **Answered**

Q.47 A tub is filled with water and a wooden cube 10 cm × 10 cm × 10 cm is placed in the water. The wooden cube is found to float on the water with a part of it submerged in water. When a metal coin is placed on the wooden cube, the submerged part is increased by 3.87 cm. The mass of the metal coin is _____ gram.
(Take water density as 1 g/cm^3 and density of wood as 0.4 g/cm^3)

Given **387**
Answer :

Question Type : **SA**
Question ID : **69112150**
Status : **Answered**

Q.48 A vessel contains 0.15 m^3 of a gas at pressure 8 bar and temperature 140 °C with $c_p = 3R$ and $c_v = 2R$. It is expanded adiabatically till pressure falls to 1 bar. The work done during this process is _____ k J. (R is gas constant)

Given **120**
Answer :

Question Type : **SA**
Question ID : **69112147**
Status : **Answered**

Q.49 In single slit diffraction pattern, the wavelength of light used is 628 nm and slit width is 0.2 mm, the angular width of central maximum is $\alpha \times 10^{-2}$ degrees. The value of α is _____.

Given **18**
Answer :

Question Type : **SA**
Question ID : **69112146**
Status : **Answered**

Q.50 A uniform wire of length l of weight w is suspended from the roof with a weight of W at the other end. The stress in the wire at $\frac{l}{3}$ distance from the top is $\left(\frac{W}{A}+\frac{2}{\gamma}\frac{w}{A}\right)$, where, A is the cross sectional area of the wire. The value of γ is _____.

Given Answer : **3**

Question Type : **SA**
Question ID : **69112149**
Status : **Answered**

Section : **Chemistry Section A**

Q.51 Match **List - I** with **List - II**.

	List - I **Mixture of Compounds**		**List - II** **Reagent used to distinguish**
A.	Diethyl amine + Ethyl amine	I.	Bromine water
B.	Acetaldehyde + Acetone	II.	$CHCl_3$ + KOH, Δ
C.	Ethanol + Phenol	III.	Neutral $FeCl_3$
D.	Benzoic acid + Cinnamic acid	IV.	Ammonical silver nitrate

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

Options

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

Question Type : **MCQ**
Question ID : **69112167**
Option 1 ID : **691121235**
Option 2 ID : **691121238**
Option 3 ID : **691121236**
Option 4 ID : **691121237**
Status : **Answered**
Chosen Option : **2**

Q.52 Given below are two statements :

Statement (I) : Oxidising power of halogens decreases in the order $F_2 > Cl_2 > Br_2 > I_2$, which is the basis of "Layer test".

Statement (II) : "Layer test" to identify Br_2 and I_2 in aqueous solution involves the oxidation of bromide or iodide into Br_2 or I_2 respectively with Cl_2, which is a type of displacement redox reaction.

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

Options

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

Question Type : **MCQ**
Question ID : **69112160**
Option 1 ID : **691121209**
Option 2 ID : **691121208**
Option 3 ID : **691121210**
Option 4 ID : **691121207**
Status : **Answered**
Chosen Option : **4**

Q.53 Given below are two statements :

Statement (I) : The correct sequence of bond lengths in the following species is :

$O_2^+ < O_2 < O_2^- < O_2^{2-}$

Statement (II) : The correct sequence of number of unpaired electrons in the following species is :

$O_2 > O_2^+ > O_2^- > O_2^{2-}$

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

Options

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

Question Type : **MCQ**
Question ID : **69112153**
Option 1 ID : **691121182**
Option 2 ID : **691121179**
Option 3 ID : **691121180**
Option 4 ID : **691121181**
Status : **Answered**
Chosen Option : **4**

Q.54 What is the energy (in J atom^{-1}) required for the following process ?

$Li^{2+}(g) \rightarrow Li^{3+}(g) + e^-$

(Take the ionization energy for the H atom in the ground state as 2.18×10^{-18} J atom^{-1})

Options

1. 1.962×10^{-17}
2. 1.962×10^{-18}
3. 8.72×10^{-18}
4. 6.54×10^{-17}

Question Type : **MCQ**
Question ID : **69112152**
Option 1 ID : **691121177**
Option 2 ID : **691121176**
Option 3 ID : **691121175**
Option 4 ID : **691121178**
Status : **Answered**
Chosen Option : **1**

Q.55 Given below are two statements :

Statement (I) : 1,2,3-Trihydroxypropane can be separated from water by simple distillation.

Statement (II) : An azeotropic mixture cannot be separated by fractional distillation.

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

Options

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

Question Type : **MCQ**
Question ID : **69112163**
Option 1 ID : **691121219**
Option 2 ID : **691121220**
Option 3 ID : **691121222**
Option 4 ID : **691121221**
Status : **Answered**
Chosen Option : **3**

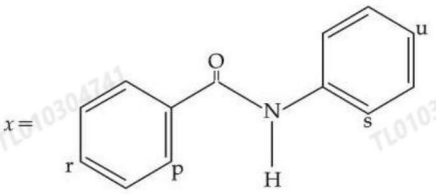
Q.56 $t_{100\%}$ is the time required for the 100% completion of the reaction while $t_{½}$ is the time required for 50% of the reaction to be completed. Which of the following option correctly represents the relation between $t_{100\%}$ and $t_{½}$ for zero and first order reactions respectively ?

Options

1. $t_{100\%} = 2t_{½}$ and $t_{100\%} = (t_{½})^{\infty}$
2. $t_{100\%} = 2t_{½}$ and $t_{100\%} = (2t_{½})^{2}$
3. $t_{100\%} = (t_{½})^{\infty}$ and $t_{100\%} = 2t_{½}$
4. $t_{100\%} = (t_{½})^{2}$ and $t_{100\%} = (t_{½})^{-\infty}$

Question Type : **MCQ**
Question ID : **69112158**
Option 1 ID : **691121200**
Option 2 ID : **691121201**
Option 3 ID : **691121202**
Option 4 ID : **691121199**
Status : **Answered**
Chosen Option : **1**

Q.57 For the given molecule, "*x*", the preferred site for the attack of the electrophile is :



Options

1. Predominantly at "r"
2. Predominantly at "u"
3. "r" and "u"
4. "p" and "s"

Question Type : **MCQ**
Question ID : **69112166**
Option 1 ID : **691121231**
Option 2 ID : **691121234**
Option 3 ID : **691121232**
Option 4 ID : **691121233**
Status : **Answered**
Chosen Option : **2**

Q.58 19.5 g of fluoro acetic acid (molar mass = 78 g mol^{-1}) is dissolved in 500 g of water at 298 K. The depression in the freezing point of water was 1°C. What is K_a of fluoro acetic acid ? (For water, $K_f = 1.86$ K kg mol^{-1}). Assume molarity and molality to have same values.

Options

1. 3×10^{-5}
2. 10^{-6}
3. 3×10^{-3}
4. 4×10^{-4}

Question Type : **MCQ**
Question ID : **69112155**
Option 1 ID : **691121189**
Option 2 ID : **691121187**
Option 3 ID : **691121190**
Option 4 ID : **691121188**
Status : **Answered**
Chosen Option : **4**

Q.59

Match **List - I** with **List - II**.

List - I Chromium (III) Complexes (en = ethylene diamine)		**List - II** $\Delta_0(cm^{-1})$	
A.	$[Cr(CN)_6]^{3-}$	I.	15,060
B.	$[CrF_6]^{3-}$	II.	17,400
C.	$[Cr(H_2O)_6]^{3+}$	III.	22,300
D.	$[Cr(en)_3]^{3+}$	IV.	26,600

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

Options

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

Question Type : **MCQ**
Question ID : **69112162**
Option 1 ID : **691121217**
Option 2 ID : **691121218**
Option 3 ID : **691121215**
Option 4 ID : **691121216**
Status : **Answered**
Chosen Option : **2**

Q.60 Given below are two statements :

Statement (I) : The first ionisation enthalpy of the elements Na, Mg, Cl and Ar follows the order Na > Mg > Cl > Ar.

Statement (II) : Among Ca, Al, Fe and B, the third ionisation enthalpy is very high for Ca.

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

Options

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

Question Type : **MCQ**
Question ID : **69112159**
Option 1 ID : **691121203**
Option 2 ID : **691121204**
Option 3 ID : **691121205**
Option 4 ID : **691121206**
Status : **Answered**
Chosen Option : **4**

Q.61 The solubility product constants of Ag_2CrO_4 and AgBr are $32x$ and $4y$ respectively at 298 K.

The value of $\left(\frac{\text{molarity of } Ag_2CrO_4}{\text{molarity of AgBr}}\right)$ can be expressed as :

Options

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

2. $\sqrt{\frac{x}{y}}$

3. $\frac{\sqrt[3]{x}}{\sqrt{y}}$

4. $\frac{2\sqrt[3]{x}}{y}$

Question Type : **MCQ**
Question ID : **69112156**
Option 1 ID : **691121192**
Option 2 ID : **691121193**
Option 3 ID : **691121194**
Option 4 ID : **691121191**
Status : **Answered**
Chosen Option : **3**

Q.62

Consider the following data.

(i) $2Al(s) + 6HCl(aq) \rightarrow Al_2Cl_6(aq) + 3H_2(g) + 1200\ kJ/mol$

(ii) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g) + 164\ kJ/mol.$

(iii) $HCl(g) + aq \rightarrow HCl(aq) + 83\ kJ/mol.$

(iv) $Al_2Cl_6(s) + aq \rightarrow Al_2Cl_6(aq) + 663\ kJ/mol$

The enthalpy of formation of anhydrous solid Al_2Cl_6 is :

Options

1. $-1527\ kJ\ mol^{-1}$
2. $-648\ kJ\ mol^{-1}$
3. $-2002\ kJ\ mol^{-1}$
4. $-1350\ kJ\ mol^{-1}$

Question Type : **MCQ**
Question ID : **69112154**
Option 1 ID : **691121186**
Option 2 ID : **691121183**
Option 3 ID : **691121185**
Option 4 ID : **691121184**
Status : **Answered**
Chosen Option : **1**

Q.63

In IUPAC nomenclature, the **correct** order of decreasing priority of functional group is :

Options

1. $-CONH_2,\ -CHO,\ -CN,\ -NH_2,\ -C \equiv C-$
2. $-CONH_2,\ -COOCH_3,\ -CHO,\ -NH_2,\ -OH$
3. $-CONH_2,\ -CHO,\ \rangle C=O,\ -NH_2,\ -C \equiv C-$
4. $-CONH_2,\ \rangle C=O,\ -CHO,\ -NH_2,\ -C \equiv C-$

Question Type : **MCQ**
Question ID : **69112165**
Option 1 ID : **691121230**
Option 2 ID : **691121228**
Option 3 ID : **691121229**
Option 4 ID : **691121227**
Status : **Answered**
Chosen Option : **3**

Q.64 The mass of iron converted into Fe_3O_4 by the action of 18 g of steam is :
(Given : Molar mass of H, O and Fe are 1, 16 and 56 g mol^{-1} respectively)
Assume iron is present in excess :

Options

1. 21 g
2. 4.2 g
3. 42 g
4. 2.1 g

Question Type : **MCQ**
Question ID : **69112151**
Option 1 ID : **691121173**
Option 2 ID : **691121172**
Option 3 ID : **691121174**
Option 4 ID : **691121171**
Status : **Answered**
Chosen Option : **3**

Q.65 Given below are two statements :
Statement (I) : Benzyl chloride reacts faster in S_N1 mechanism than ethyl chloride.
Statement (II) : Ethyl carbocation intermediate is less stabilized by hyperconjugation than benzyl carbocation by resonance.
In the light of the above statements, choose the **correct answer** from the options given below :

Options

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

Question Type : **MCQ**
Question ID : **69112164**
Option 1 ID : **691121225**
Option 2 ID : **691121226**
Option 3 ID : **691121223**
Option 4 ID : **691121224**
Status : **Answered**
Chosen Option : **3**

Q.66 A salt with few drops of conc. HCl gives apple green colour in flame test. The group precipitate of the salt is dissolved in acetic acid and treated with K_2CrO_4 to give yellow precipitate. When the sodium carbonate extract of the salt solution is heated with conc. HNO_3 and ammonium molybdate, it resulted a canary yellow precipitate. The cation and anion present in the salt are respectively,

Options

1. Mn^{2+} and PO_4^{3-}
2. Ba^{2+} and PO_4^{3-}
3. Ca^{2+} and SO_4^{2-}
4. Ba^{2+} and SO_4^{2-}

Question Type : **MCQ**
Question ID : **69112170**
Option 1 ID : **691121249**
Option 2 ID : **691121248**
Option 3 ID : **691121247**
Option 4 ID : **691121250**
Status : **Answered**
Chosen Option : **2**

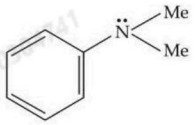
Q.67 Which of the following sets includes all the species that will change the orange colour of $K_2Cr_2O_7$ in acidic medium ?

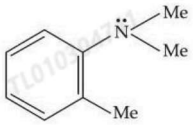
Options

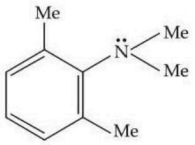
1. $Fe^{2+}, Sn^{2+}, I^-, S^{2-}$
2. $Fe^{2+}, NO_2^-, SO_2, Sn^{4+}$
3. $S^{2-}, Fe^{3+}, I^-, C_2O_4^{2-}$
4. $Fe^{3+}, SO_4^{2-}, S^{2-}, Sn^{4+}$

Question Type : **MCQ**
Question ID : **69112161**
Option 1 ID : **691121211**
Option 2 ID : **691121213**
Option 3 ID : **691121212**
Option 4 ID : **691121214**
Status : **Answered**
Chosen Option : **1**

Q.68 Consider the three aromatic molecules (P, Q and R) whose structures have been given below :

P. 

Q. 

R. 

The **correct** order regarding the reactivity of these compounds with $Ph-\underset{(+)}{N}\equiv N\,Cl^{(-)}$ under optimum but slightly acidic medium is :

Options

1. $P > R > Q$

2. $P > Q > R$

3. $R > Q > P$

4. $R > P > Q$

Question Type : **MCQ**
Question ID : **69112168**
Option 1 ID : **691121242**
Option 2 ID : **691121239**
Option 3 ID : **691121241**
Option 4 ID : **691121240**
Status : **Answered**
Chosen Option : **2**

Q.69

Match **List - I** with **List - II**.

List - I **Vitamin**		**List - II** **Name**
A.	Vitamin B_1	I. Pyridoxine
B.	Vitamin B_2	II. Ascorbic acid
C.	Vitamin B_6	III. Thiamine
D.	Vitamin C	IV. Riboflavin

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

Options

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

Question Type : **MCQ**
Question ID : **69112169**
Option 1 ID : **691121244**
Option 2 ID : **691121245**
Option 3 ID : **691121243**
Option 4 ID : **691121246**
Status : **Answered**
Chosen Option : **2**

Q.70 An electrochemical cell is constructed using half cells in the direction of spontaneous change

$Fe(OH)_2(s) + 2e^- \rightarrow Fe(s) + 2OH^-(aq)$ $E^\theta = -0.88$ V

and $AgBr(s) + e^- \rightarrow Ag(s) + Br^-(aq)$ $E^\theta = +0.07$ V

Which of the following option is **correct** ?

Options

1. $E^\theta_{cell} = -0.95$ V

2. Fe is reduced in the electrochemical cell

3. E^θ_{cell} is an extensive property

4. Overall reaction $Fe(s)+2OH^-(aq)+2AgBr(s) \rightleftharpoons Fe(OH)_2(s)+2Ag(s)+2Br^-(aq)$

Question Type : **MCQ**
Question ID : **69112157**
Option 1 ID : **691121196**
Option 2 ID : **691121197**
Option 3 ID : **691121198**
Option 4 ID : **691121195**
Status : **Answered**
Chosen Option : **4**

Section : **Chemistry Section B**

Q.71 Consider the isomers of hydrocarbon with molecular formula C_5H_{10}. These isomers do not decolourise $KMnO_4$ solution. These isomers are subjected to chlorination with chlorine in presence of light to give monochloro compounds. The total number of monochloro compounds (structural isomers only) formed is _____.

Given **14**
Answer :

Question Type : **SA**
Question ID : **69112172**
Status : **Answered**

Q.72 At the transition temperature T, $A \rightleftharpoons B$ and $\Delta G^0 = 105 - 35 \log T$ where A and B are two states of substance X. The transition temperature in °C when pressure is 1 atm is _____. (Nearest integer)

Given **727**
Answer :

Question Type : **SA**
Question ID : **69112175**
Status : **Answered**

Q.73 5.33 g of $CrCl_3 \cdot 6H_2O$, which is a 1 : 3 electrolyte, is dissolved in water and is passed through a cation exchanger. The chloride ions in the eluted solution, on treatment with $AgNO_3$ results in 8.61 g of AgCl. The ratio of moles of complex reacted and moles of AgCl formed is _____ $\times 10^{-2}$. (Nearest integer)

[Molar mass in g mol^{-1} Cr : 52, Ag : 108, Cl : 35.5, H : 1, O : 16]

Given **67**
Answer :

Question Type : **SA**
Question ID : **69112171**
Status : **Answered**

Q.74 One mole of an alkane (x) requires 8 mole oxygen for complete combustion. Sum of number of carbon and hydrogen atoms in the alkane (x) is _____.

Given **17**
Answer :

Question Type : **SA**
Question ID : **69112173**
Status : **Answered**

Q.75 For reaction A $\rightarrow$ P, rate constant $k = 1.5 \times 10^3\ s^{-1}$ at 27°C

If activation energy for the above reaction is 60 kJ mol^{-1}, then the temperature (in °C) at which rate constant, $k = 4.5 \times 10^3\ s^{-1}$ is _____. (Nearest integer)

Given : log 2 = 0.30, log 3 = 0.48, R = 8.3 J K^{-1} mol^{-1}, ln 10 = 2.3

Given **--**
Answer :

Question Type : **SA**
Question ID : **69112174**
Status : **Not Answered**

Exam Summary

B. Tech

Section Name	No. of Questions	Answered	Not Answered	Marked for Review	Answered & Marked for Review	Not Visited
Mathematics Section A	20	20	0	0	0	0
Mathematics Section B	5	5	0	0	0	0
Physics Section A	20	18	2	0	0	0
Physics Section B	5	5	0	0	0	0
Chemistry Section A	20	20	0	0	0	0
Chemistry Section B	5	4	1	0	0	0

"