NTA JEE Mains Apr 2026 Paper I

Section : **Mathematics Section A**

Q.1 If the system of linear equations :

$$x+y+z=6,$$
$$x+2y+5z=10,$$
$$2x+3y+\lambda z=\mu$$

has infinitely many solutions, then the value of $\lambda+\mu$ equals :

Options

1. 22
2. 12
3. 16
4. 28

Question Type : **MCQ**
Question ID : **691121528**
Option 1 ID : **6911211796**
Option 2 ID : **6911211794**
Option 3 ID : **6911211795**
Option 4 ID : **6911211797**
Status : **Marked For Review**
Chosen Option : **1**

Q.2 Let $y = y(x)$ be the solution of the differential equation

$x\sqrt{1-x^2}\,dy + \left(y\sqrt{1-x^2} - x\cos^{-1}x\right)dx = 0, x \in (0, 1), \lim\limits_{x\to 1^-} y(x) = 1$. Then $y\left(\frac{1}{2}\right)$ equals :

Options

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

Question Type : **MCQ**
Question ID : **691121542**
Option 1 ID : **6911211850**
Option 2 ID : **6911211851**
Option 3 ID : **6911211853**
Option 4 ID : **6911211852**
Status : **Not Answered**
Chosen Option : **--**

Q.3 If $26\left(\frac{2^3}{3}\left({}^{12}C_2\right) + \frac{2^5}{5}\left({}^{12}C_4\right) + \frac{2^7}{7}\left({}^{12}C_6\right) + \cdots + \frac{2^{13}}{13}\left({}^{12}C_{12}\right)\right) = 3^{13} - \alpha$, then α is equal to :

Options

1. 48
2. 54
3. 51
4. 45

Question Type : **MCQ**
Question ID : **691121533**
Option 1 ID : **6911211815**
Option 2 ID : **6911211817**
Option 3 ID : **6911211816**
Option 4 ID : **6911211814**
Status : **Not Answered**
Chosen Option : **--**

Q.4

Let $\alpha = 3\sin^{-1}\left(\frac{6}{11}\right)$ and $\beta = 3\cos^{-1}\left(\frac{4}{9}\right)$, where inverse trigonometric functions take only the principal values.

Given below are two statements :

Statement I : $\cos(\alpha+\beta) > 0$.

Statement II : $\cos(\alpha) < 0$.

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 : **691121537**
Option 1 ID : **6911211830**
Option 2 ID : **6911211831**
Option 3 ID : **6911211832**
Option 4 ID : **6911211833**
Status : **Answered**
Chosen Option : **3**

Q.5

Let $\alpha = 3+4+8+9+13+14+\ldots$ upto 40 terms. If $(\tan\beta)^{\frac{\alpha}{1020}}$ is a root of the equation $x^2+x-2=0$, $\beta \in \left(0, \frac{\pi}{2}\right)$, then $\sin^2\beta + 3\cos^2\beta$ is equal to :

Options

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

Question Type : **MCQ**
Question ID : **691121530**
Option 1 ID : **6911211805**
Option 2 ID : **6911211804**
Option 3 ID : **6911211802**
Option 4 ID : **6911211803**
Status : **Not Answered**
Chosen Option : **--**

Q.6 For the function $f(x) = e^{\sin|x|} - |x|$, $x \in \mathbf{R}$, consider the following statements :

Statement I : f is differentiable for all $x \in \mathbf{R}$.

Statement II : f is increasing in $\left(-\pi, -\frac{\pi}{2}\right)$.

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

Question Type : **MCQ**
Question ID : **691121538**
Option 1 ID : **6911211835**
Option 2 ID : **6911211836**
Option 3 ID : **6911211837**
Option 4 ID : **6911211834**
Status : **Answered**
Chosen Option : **3**

Q.7 Let O be the vertex of the parabola $y^2 = 4x$ and its chords OP and OQ are perpendicular to each other. If the locus of the mid-point of the line segment PQ is a conic C, then the length of its latus rectum is :

Options

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

Question Type : **MCQ**
Question ID : **691121536**
Option 1 ID : **6911211828**
Option 2 ID : **6911211826**
Option 3 ID : **6911211829**
Option 4 ID : **6911211827**
Status : **Not Answered**
Chosen Option : **--**

Q.8 If a straight line drawn through the point of intersection of the lines $4x+3y-1=0$ and $3x+4y-1=0$, meets the co-ordinate axes at the points P and Q, then the locus of the mid point of PQ is :

Options

1. $2x+y+14xy=0$
2. $x+y-7=0$
3. $x+2y-14xy=0$
4. $x+y-14xy=0$

Question Type : **MCQ**
Question ID : **691121535**
Option 1 ID : **6911211824**
Option 2 ID : **6911211822**
Option 3 ID : **6911211825**
Option 4 ID : **6911211823**
Status : **Marked For Review**
Chosen Option : **4**

Q.9 The number of values of $z \in \mathbb{C}$, satisfying the equations $|z-(4+8i)|=\sqrt{10}$ and $|z-(3+5i)|+|z-(5+11i)|=4\sqrt{5}$, is :

Options

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

Question Type : **MCQ**
Question ID : **691121527**
Option 1 ID : **6911211790**
Option 2 ID : **6911211792**
Option 3 ID : **6911211793**
Option 4 ID : **6911211791**
Status : **Not Answered**
Chosen Option : **--**

Q.10

Let the foot of perpendicular from the point $(\lambda, 2, 3)$ on the line $\frac{x-4}{1} = \frac{y-9}{2} = \frac{z-5}{1}$ be the point $(1, \mu, 2)$. Then the distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+4}{6}$ and $\frac{x-\lambda}{2} = \frac{y-\mu}{3} = \frac{z+5}{6}$ is equal to :

Options

1. $\frac{\sqrt{145}}{7}$

2. $\frac{\sqrt{146}}{7}$

3. $\frac{\sqrt{143}}{7}$

4. $\frac{12}{7}$

Question Type : **MCQ**
Question ID : **691121540**
Option 1 ID : **6911211843**
Option 2 ID : **6911211844**
Option 3 ID : **6911211845**
Option 4 ID : **6911211842**
Status : **Not Answered**
Chosen Option : **--**

Q.11

Let $f(x)=\begin{cases}\frac{1}{3} & , x \le \pi/2 \\ \frac{b(1-\sin x)}{(\pi-2x)^2} & , x > \pi/2\end{cases}$. If f is continuous at $x=\pi/2$, then the value of $\int_0^{3b-6} |x^2+2x-3|\,dx$ is:

Options

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

Question Type : **MCQ**
Question ID : **691121544**
Option 1 ID : **6911211858**
Option 2 ID : **6911211859**
Option 3 ID : **6911211860**
Option 4 ID : **6911211861**
Status : **Not Answered**
Chosen Option : **--**

Q.12

Let $\vec{a}=4\hat{i}-\hat{j}+3\hat{k}$, $\vec{b}=10\hat{i}+2\hat{j}-\hat{k}$ and a vector $\vec{c}$ be such that $2(\vec{a}\times\vec{b})+3(\vec{b}\times\vec{c})=\vec{0}$.

If $\vec{a}\cdot\vec{c}=15$, then $\vec{c}\cdot(\hat{i}+\hat{j}-3\hat{k})$ is equal to:

Options

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

Question Type : **MCQ**
Question ID : **691121539**
Option 1 ID : **6911211839**
Option 2 ID : **6911211840**
Option 3 ID : **6911211838**
Option 4 ID : **6911211841**
Status : **Not Answered**
Chosen Option : **--**

Q.13 Let $A=\begin{bmatrix}\alpha & 1 & 2\\ 2 & 3 & 0\\ 0 & 4 & 5\end{bmatrix}$ and $B=\begin{bmatrix}1 & 0 & 0\\ 0 & -5\alpha & 0\\ 0 & 4\alpha & -2\alpha\end{bmatrix}+\text{adj}(A)$. If $\det(B)=66$, then $\det(\text{adj}(A))$ equals :

Options

1. 361
2. 529
3. 289
4. 441

Question Type : **MCQ**
Question ID : **691121529**
Option 1 ID : **6911211799**
Option 2 ID : **6911211801**
Option 3 ID : **6911211798**
Option 4 ID : **6911211800**
Status : **Not Answered**
Chosen Option : **--**

Q.14 A person has three different bags and four different books. The number of ways, in which he can put these books in the bags so that no bag is empty, is :

Options

1. 72
2. 36
3. 18
4. 39

Question Type : **MCQ**
Question ID : **691121534**
Option 1 ID : **6911211821**
Option 2 ID : **6911211819**
Option 3 ID : **6911211818**
Option 4 ID : **6911211820**
Status : **Marked For Review**
Chosen Option : **1**

Q.15 Let $f:(1,\infty)\to\mathbf{R}$ be a function defined as $f(x)=\frac{x-1}{x+1}$. Let $f^{i+1}(x)=f\left(f^{i}(x)\right)$, $i=1, 2,...,25$, where $f^1(x)=f(x)$. If $g(x)+f^{26}(x)=0$, $x\in(1,\infty)$, then the area of the region bounded by the curves $y=g(x)$, $2y=2x-3$, $y=0$ and $x=4$ is :

Options

1. $\frac{1}{8}+\log_e 2$
2. $\frac{5}{6}+\log_e 2$
3. $\frac{1}{4}+\log_e 2$
4. $\frac{5}{6}+3\log_e 2$

Question Type : **MCQ**
Question ID : **691121543**
Option 1 ID : **6911211854**
Option 2 ID : **6911211857**
Option 3 ID : **6911211855**
Option 4 ID : **6911211856**
Status : **Not Answered**
Chosen Option : **--**

Q.16 Consider the relation R on the set $\{-2,-1, 0, 1, 2\}$ defined by $(a, b)\in R$ if and only if $1+ab>0$. Then, among the statements :

I. The number of elements in R is 17
II. R is an equivalence relation

Options

1. Neither I nor II is true
2. Only II is true
3. Both I and II are true
4. Only I is true

Question Type : **MCQ**
Question ID : **691121526**
Option 1 ID : **6911211789**
Option 2 ID : **6911211787**
Option 3 ID : **6911211788**
Option 4 ID : **6911211786**
Status : **Not Answered**
Chosen Option : **--**

Q.17

The value of the integral $\int_0^2 \frac{\sqrt{x(x^2+x+1)}}{(\sqrt{x+1})(\sqrt{x^4+x^2+1})}\,dx$ is equal to :

Options

1. $\frac{1}{3}\log_e(1+6\sqrt{2})$

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

3. $\frac{1}{3}\log_e(3-2\sqrt{2})$

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

Question Type : **MCQ**
Question ID : **691121541**
Option 1 ID : **6911211849**
Option 2 ID : **6911211848**
Option 3 ID : **6911211846**
Option 4 ID : **6911211847**
Status : **Not Answered**
Chosen Option : **--**

Q.18 A candidate has to go to the examination centre to appear in an examination. The candidate uses only one means of transportation for the entire distance out of bus, scooter and car. The probabilities of the candidate going by bus, scooter and car, respectively, are $\frac{2}{5}$, $\frac{1}{5}$ and $\frac{2}{5}$. The probabilities that the candidate reaches late at the examination centre are $\frac{1}{5}$, $\frac{1}{3}$ and $\frac{1}{4}$ if the candidate uses bus, scooter and car, respectively. Given that the candidate reached late at the examination centre, the probability that the candidate travelled by bus is :

Options

1. $\frac{11}{37}$
2. $\frac{14}{37}$
3. $\frac{13}{37}$
4. $\frac{12}{37}$

Question Type : **MCQ**
Question ID : **691121531**
Option 1 ID : **6911211806**
Option 2 ID : **6911211809**
Option 3 ID : **6911211808**
Option 4 ID : **6911211807**
Status : **Answered**
Chosen Option : **4**

Q.19 A set of four observations has mean 1 and variance 13. Another set of six observations has mean 2 and variance 1. Then, the variance of all these 10 observations is equal to :

Options

1. 6.04
2. 6.14
3. 6.24
4. 5.96

Question Type : **MCQ**
Question ID : **691121532**
Option 1 ID : **6911211812**
Option 2 ID : **6911211811**
Option 3 ID : **6911211813**
Option 4 ID : **6911211810**
Status : **Not Answered**
Chosen Option : **--**

Q.20

Let $\frac{x^2}{f(a^2+7a+3)}+\frac{y^2}{f(3a+15)}=1$ represent an ellipse with major axis along y-axis, where f is a strictly decreasing positive function on $\mathbf{R}$. If the set of all possible values of a is $\mathbf{R}-[\alpha,\beta]$, then $\alpha^2+\beta^2$ is equal to :

Options

1. 24
2. 40
3. 61
4. 28

Question Type : **MCQ**
Question ID : **691121545**
Option 1 ID : **6911211865**
Option 2 ID : **6911211863**
Option 3 ID : **6911211864**
Option 4 ID : **6911211862**
Status : **Not Answered**
Chosen Option : **--**

Section : **Mathematics Section B**

Q.21

Consider the circle C : $x^2+y^2-6x-8y-11=0$. Let a variable chord AB of the circle C subtend a right angle at the origin. If the locus of the foot of the perpendicular drawn from the origin on the chord AB is the circle $x^2+y^2-\alpha x-\beta y-\gamma=0$, then $\alpha+\beta+2\gamma$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121549**
Status : **Not Answered**

Q.22

If $\int_{\pi/6}^{\pi/4}\left(\cot\left(x-\frac{\pi}{3}\right)\cot\left(x+\frac{\pi}{3}\right)+1\right)dx=\alpha\log_e(\sqrt{3}-1)$, then $9\alpha^2$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121547**
Status : **Not Answered**

Q.23 Let a line L_1 pass through the origin and be perpendicular to the lines

$L_2: \vec{r} = (3 + t)\hat{i} + (2t - 1)\hat{j} + (2t + 4)\hat{k}$ and

$L_3: \vec{r} = (3 + 2s)\hat{i} + (3 + 2s)\hat{j} + (2 + s)\hat{k}$, $t, s \in \mathbf{R}$.

If (a, b, c), $a \in \mathbf{Z}$, is the point on L_3 at a distance of $\sqrt{17}$ from the point of intersection of L_1 and L_2, then $(a+b+c)^2$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121548**
Status : **Not Answered**

Q.24 The sum of squares of all the real solutions of the equation $\log_{(x+1)}(2x^2+5x+3) = 4 - \log_{(2x+3)}(x^2+2x+1)$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121546**
Status : **Not Answered**

Q.25 Let f be a polynomial function such that

$\log_2(f(x)) = \left(\log_2\left(2 + \frac{2}{3} + \frac{2}{9} + \ldots\ldots \infty\right)\right) \cdot \log_3\left(1 + \frac{f(x)}{f\left(\frac{1}{x}\right)}\right)$, $x > 0$ and $f(6) = 37$. Then $\sum_{n=1}^{10} f(n)$ is equal to _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121550**
Status : **Not Answered**

Section : **Physics Section A**

Q.26 Two radioactive substances A and B of mass numbers 200 and 212 respectively, shows spontaneous α-decay with same Q value of 1 MeV. The ratio of energies of α-rays produced by A and B is _____.

Options

1. $\frac{2706}{2646}$
2. $\frac{2597}{2600}$
3. $\frac{2862}{2499}$
4. $\frac{2548}{2650}$

Question Type : **MCQ**
Question ID : **691121569**
Option 1 ID : **6911211944**
Option 2 ID : **6911211945**
Option 3 ID : **6911211946**
Option 4 ID : **6911211943**
Status : **Not Answered**
Chosen Option : **--**

Q.27 A gas balloon is going up with a constant velocity of 10 m/s. When this balloon reached a height of 75 m, a stone is dropped from it and balloon keeps moving up with the same velocity. The height of the balloon when the stone hits the ground is _____ m. (Take $g = 10\ m/s^2$)

Options

1. 129
2. 150
3. 85
4. 125

Question Type : **MCQ**
Question ID : **691121554**
Option 1 ID : **6911211885**
Option 2 ID : **6911211884**
Option 3 ID : **6911211883**
Option 4 ID : **6911211886**
Status : **Marked For Review**
Chosen Option : **3**

Q.28 The frequency of oscillation of a mass m suspended by a spring is v_1. If the length of the spring is cut to half, the same mass oscillates with frequency v_2. The value of v_2/v_1 is _____.

Options

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

Question Type : **MCQ**
Question ID : **691121562**
Option 1 ID : **6911211915**
Option 2 ID : **6911211918**
Option 3 ID : **6911211916**
Option 4 ID : **6911211917**
Status : **Marked For Review**
Chosen Option : **4**

Q.29 A car moving with a speed of 54 km/h takes a turn of radius 20 m. A simple pendulum is suspended from the ceiling of the car. Determine the angle made by the string of the pendulum with the vertical during the turning. (Take $g = 10\ m/s^2$)

Options

1. $\tan^{-1}(1.125)$
2. $\tan^{-1}(0.75)$
3. $\tan^{-1}(0.5)$
4. $\tan^{-1}(0.25)$

Question Type : **MCQ**
Question ID : **691121553**
Option 1 ID : **6911211881**
Option 2 ID : **6911211880**
Option 3 ID : **6911211879**
Option 4 ID : **6911211882**
Status : **Not Answered**
Chosen Option : **--**

Q.30 A 30 cm long solenoid has 10 turns per cm and area of 5 cm^2. The current through the solenoid coil varies from 2 A to 4 A in 3.14 s. The e.m.f. induced in the coil is $\alpha \times 10^{-5}$ V. The value α is _____.

Options

1. 120
2. 60
3. 12
4. 34

Question Type : **MCQ**
Question ID : **691121565**
Option 1 ID : **6911211929**
Option 2 ID : **6911211927**
Option 3 ID : **6911211928**
Option 4 ID : **6911211930**
Status : **Not Answered**
Chosen Option : **--**

Q.31 A thin biconvex lens is prepared from the glass ($\mu = 1.5$) both curved surfaces of which have equal radii of 20 cm each. Left side surface of the lens is silvered from outside to make it reflecting. To have the position of image and object at the same place, the object should be placed, from the lens at a distance of _____ cm.

Options

1. 13.5
2. 13
3. 12.5
4. 10

Question Type : **MCQ**
Question ID : **691121555**
Option 1 ID : **6911211890**
Option 2 ID : **6911211889**
Option 3 ID : **6911211888**
Option 4 ID : **6911211887**
Status : **Marked For Review**
Chosen Option : **4**

Q.32

A current carrying circular loop of radius 2 cm with unit normal $\hat{n} = \frac{\hat{k} + \hat{i}}{\sqrt{2}}$ is placed in a magnetic field, $\vec{B} = B_0\left(3\hat{i} + 2\hat{k}\right)$. If $B_0 = 4 \times 10^{-3}$ T and current $I = 100\sqrt{2}$ A, the torque experienced by the loop is _____ Wb.A. ($\pi = 3.14$)

Options

1. $16 \times 10^{-5}\ \hat{k}$
2. $5024 \times 10^{-7}\ \hat{k}$
3. $5024 \times 10^{-7}\ \hat{i}$
4. $5024 \times 10^{-7}\ \hat{j}$

Question Type : **MCQ**
Question ID : **691121564**
Option 1 ID : **6911211923**
Option 2 ID : **6911211924**
Option 3 ID : **6911211925**
Option 4 ID : **6911211926**
Status : **Marked For Review**
Chosen Option : **2**

Q.33

A new unit (α) of length is chosen such that it is equal to the speed of light in vacuum. What is the distance between Venus and Earth in terms of α units if light takes 6 min. 40 s to cover this distance ?

Options

1. 400 α
2. 200 α
3. 300 α
4. 500 α

Question Type : **MCQ**
Question ID : **691121551**
Option 1 ID : **6911211872**
Option 2 ID : **6911211871**
Option 3 ID : **6911211873**
Option 4 ID : **6911211874**
Status : **Marked For Review**
Chosen Option : **1**

Q.34 Initial pressure and volume of a monoatomic ideal gas are P and V. The change in internal energy of this gas in adiabatic expansion to volume $V_{final} = 27\ V$ is _____ J.

Options

1. $-\frac{4}{3}PV$
2. $-2\,PV\left(3\sqrt{3}-1\right)$
3. $\frac{4}{3}PV$
4. $\frac{3}{4}PV$

Question Type : **MCQ**
Question ID : **691121561**
Option 1 ID : **6911211913**
Option 2 ID : **6911211911**
Option 3 ID : **6911211912**
Option 4 ID : **6911211914**
Status : **Not Answered**
Chosen Option : **--**

Q.35 A liquid of density 600 kg/m^3 flowing steadily in a tube of varying cross-section. The cross-section at a point A is 1.0 cm^2 and that at B is 20 mm^2. Both the points A and B are in same horizontal plane, the speed of the liquid at A is 10 cm/s. The difference in pressures at A and B points is _____ Pa.

Options

1. 144
2. 72
3. 36
4. 18

Question Type : **MCQ**
Question ID : **691121558**
Option 1 ID : **6911211900**
Option 2 ID : **6911211902**
Option 3 ID : **6911211901**
Option 4 ID : **6911211899**
Status : **Not Answered**
Chosen Option : **--**

Q.36

Consider the equation $H = \frac{x^p \epsilon^q E^r}{t^s}$

Where H = magnetic field; E = electric field, ϵ = permittivity, x = distance, t = time

The values of p, q, r and s respectively are :

Options

1. $-1, -2, -2, 1$
2. $-1, 1, 2, 1$
3. $1, 1, 1, 1$
4. $1, -1, -2, 1$

Question Type : **MCQ**
Question ID : **691121552**
Option 1 ID : **6911211878**
Option 2 ID : **6911211876**
Option 3 ID : **6911211875**
Option 4 ID : **6911211877**
Status : **Not Answered**
Chosen Option : **--**

Q.37

K_1 and K_2 be the maximum kinetic energies of photoelectrons emitted from a surface of a given material for the light of wavelength λ_1 and λ_2, respectively. If $\lambda_1 = 2\lambda_2$ then the work function of material is given by :

Options

1. $K_1 - 2K_2$
2. $2K_2 - K_1$
3. $K_2 + 2K_1$
4. $K_2 - 2K_1$

Question Type : **MCQ**
Question ID : **691121568**
Option 1 ID : **6911211941**
Option 2 ID : **6911211940**
Option 3 ID : **6911211939**
Option 4 ID : **6911211942**
Status : **Answered**
Chosen Option : **4**

Q.38 A solid cylinder having radius R and length L is slipping on a rough horizontal plane. At time $t=0$ the cylinder has a translational velocity $v_o = 49$ m/s, perpendicular to its axis and a rotational velocity $v_o/4R$ about the centre. The time taken by the cylinder to start rolling is _____seconds. (coefficient of kinetic friction $\mu_K = 0.25$ and $g = 9.8$ m/s^2)

Options

1. 10
2. 5
3. 7.5
4. 15

Question Type : **MCQ**
Question ID : **691121557**
Option 1 ID : **6911211897**
Option 2 ID : **6911211896**
Option 3 ID : **6911211898**
Option 4 ID : **6911211895**
Status : **Not Answered**
Chosen Option : **--**

Q.39 Two identical bodies, projected with the same speed at two different angles cover the same horizontal range R. If the time of flight of these bodies are 5 s and 10 s, respectively, then the value of R is _____ m. (Take $g = 10$ m/s^2)

Options

1. 25
2. 250
3. 125
4. 500

Question Type : **MCQ**
Question ID : **691121556**
Option 1 ID : **6911211892**
Option 2 ID : **6911211891**
Option 3 ID : **6911211894**
Option 4 ID : **6911211893**
Status : **Marked For Review**
Chosen Option : **2**

Q.40 A spherical liquid drop of radius R acquires the terminal velocity v_1 when falls through a gas of viscosity η. Now the drop is broken into 64 identical droplets and each droplet acquires terminal velocity v_2 falling through the same gas. The ratio of terminal velocities v_1/v_2 is _____.

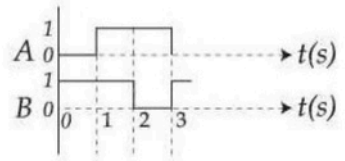
Options

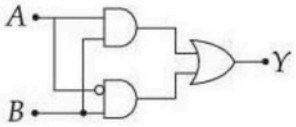
1. 4
2. 0.25
3. 32
4. 16

Question Type : **MCQ**
Question ID : **691121559**
Option 1 ID : **6911211903**
Option 2 ID : **6911211904**
Option 3 ID : **6911211905**
Option 4 ID : **6911211906**
Status : **Answered**
Chosen Option : **4**

Q.41

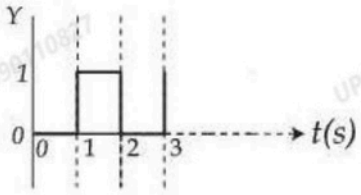
The output Y for the given inputs A and B to the circuit is :



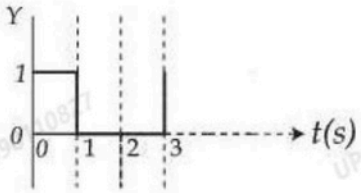


Options

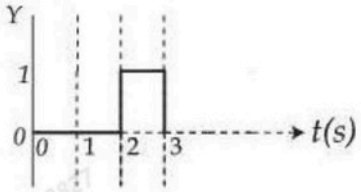
1.



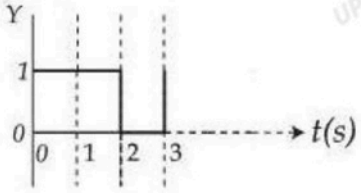
2.



3.

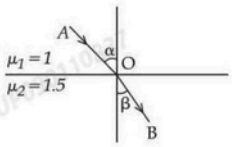


4.



Question Type : **MCQ**
Question ID : **691121570**
Option 1 ID : **6911211950**
Option 2 ID : **6911211947**
Option 3 ID : **6911211949**
Option 4 ID : **6911211948**
Status : **Not Answered**
Chosen Option : **--**

Q.42 Light ray incident along a vector $\vec{AO}\left(\vec{AO} = 2\hat{i} - 3\hat{j}\right)$ emerges out along vector $\vec{OB}\left(\vec{OB} = C\hat{i} - 4\hat{j}\right)$ as shown in the figure below. The value of C is _____.



Options

1. 16
2. 0.16
3. 1.6
4. 11.6

Question Type : **MCQ**
Question ID : **691121567**
Option 1 ID : **6911211938**
Option 2 ID : **6911211936**
Option 3 ID : **6911211935**
Option 4 ID : **6911211937**
Status : **Not Answered**
Chosen Option : **--**

Q.43 One mole of diatomic gas having rotational modes only is kept in a cylinder with a piston system. The cross-section area of the cylinder is 4 cm^2. The gas is heated slowly to raise the temperature by 1.2 °C during which the piston moves by 25 mm. The amount of heat supplied to the gas is _____ J. (Atmospheric pressure = 100 kPa, $R = 8.3$ J/mol. K) (Neglect mass of the piston)

Options

1. 25
2. 24.8
3. 29.98
4. 15.04

Question Type : **MCQ**
Question ID : **691121560**
Option 1 ID : **6911211908**
Option 2 ID : **6911211907**
Option 3 ID : **6911211910**
Option 4 ID : **6911211909**
Status : **Not Answered**
Chosen Option : **--**

Q.44

Two point charges $q_1 = 3\ \mu C$ and $q_2 = -4\ \mu C$ are placed at points $\left(2\hat{i} + 3\hat{j} + 3\hat{k}\right)$ and $\left(\hat{i} + \hat{j} + \hat{k}\right)$ respectively. Force on charge q_2 is _____ N. $\left(\text{Take } \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ SI Units}\right)$

Options

1. $\left(3\hat{i} + 6\hat{j} + 6\hat{k}\right) \times 10^{-3}$
2. $\left(4\hat{i} + 8\hat{j} + 8\hat{k}\right) \times 10^{-3}$
3. $\left(-4\hat{i} - 8\hat{j} - 8\hat{k}\right) \times 10^{-3}$
4. $\left(12\hat{i} + 24\hat{j} + 24\hat{k}\right) \times 10^{-3}$

Question Type : **MCQ**
Question ID : **691121566**
Option 1 ID : **6911211933**
Option 2 ID : **6911211932**
Option 3 ID : **6911211934**
Option 4 ID : **6911211931**
Status : **Marked For Review**
Chosen Option : **1**

Q.45

A monochromatic source of light operating at 15 kW emits 2.5×10^{22} photons/s. The region of an electromagnetic spectrum to which the emitted electromagnetic radiation belongs to _____. (Take $h = 6.6 \times 10^{-34}$ J.s and $c = 3 \times 10^8$ m/s).

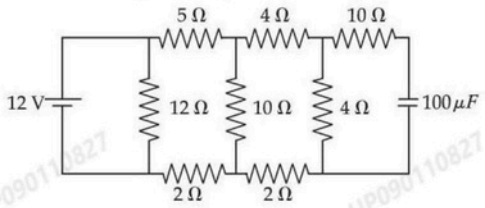
Options

1. Ultraviolet
2. Infrared
3. Microwave
4. Visible

Question Type : **MCQ**
Question ID : **691121563**
Option 1 ID : **6911211922**
Option 2 ID : **6911211920**
Option 3 ID : **6911211919**
Option 4 ID : **6911211921**
Status : **Answered**
Chosen Option : **1**

Section : **Physics Section B**

Q.46 The stored charge in the capacitor in steady state of the following circuit is _____ μC.



Given --
Answer :

Question Type : **SA**
Question ID : **691121574**
Status : **Not Answered**

Q.47 Two masses of 3.4 kg and 2.5 kg are accelerated from an initial speed of 5 m/s and 12 m/s, respectively. The distances traversed by the masses in the 5th second are 104 m and 129 m, respectively. The ratio of their momenta after 10 s is $\frac{x}{8}$. The value of x is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121575**
Status : **Not Answered**

Q.48 A 5 mg particle carrying a charge of $5\pi \times 10^{-6}$ C is moving with velocity of $\left(3\hat{i} + 2\hat{k}\right) \times 10^{-2}$ m/s in a region having magnetic field $\vec{B} = 0.1\,\hat{k}$ Wb/m^2. It moves a distance of α meter along $\hat{k}$ when it completes 5 revolutions. The value of α is _____ .

Given --
Answer :

Question Type : **SA**
Question ID : **691121573**
Status : **Not Answered**

Q.49 A parallel plate capacitor is having separation between plates 0.885 mm. It has a capacitance of 1 μF when the space between the plates is filled with an insulating material of resistivity 1×10^{13} Ωm and resistance 17.7×10^{14} Ω. Relative permittivity of the insulating material is $\alpha \times 10^7$. The value of α is _____.
(Take permittivity of free space $= 8.85 \times 10^{-12}$ F/m)

Given --
Answer :

Question Type : **SA**
Question ID : **691121571**
Status : **Not Answered**

Q.50 Some distant star is to be observed by some telescope of diameter of objective lens a, at an angular resolution of 3.0×10^{-7} radian. If the wavelength of light from the star reaching the telescope is 500 nm, the minimum diameter of the objective lens of the telescope is _____ cm. (nearest interger)

Given --
Answer :

Question Type : **SA**
Question ID : **691121572**
Status : **Not Answered**

Section : **Chemistry Section A**

Q.51 Which of the following amino acid will give violet coloured complex with neutral ferric chloride solution ?

Options

1. Tyrosine
2. Serine
3. Cysteine
4. Threonine

Question Type : **MCQ**
Question ID : **691121595**
Option 1 ID : **6911212034**
Option 2 ID : **6911212033**
Option 3 ID : **6911212035**
Option 4 ID : **6911212032**
Status : **Not Answered**
Chosen Option : **--**

Q.52 Find the **correct** statements related to group 15 hydrides.

A. Reducing nature increases from NH_3 to BiH_3

B. Tendency to donate lone pair of electrons decreases from NH_3 to BiH_3

C. The stability of hydrides decreases from NH_3 to BiH_3

D. HEH bond angle decreases from NH_3 to SbH_3 (E = Elements of group 15)

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

Options

1. B and C only

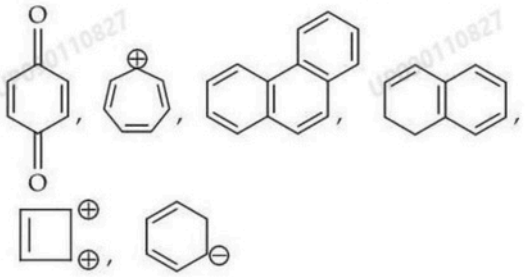
2. A, C and D Only

3. A and B only

4. A, B, C and D

Question Type : **MCQ**
Question ID : **691121584**
Option 1 ID : **6911211989**
Option 2 ID : **6911211991**
Option 3 ID : **6911211988**
Option 4 ID : **6911211990**
Status : **Marked For Review**
Chosen Option : **1**

Q.53 The total number of aromatic compounds/species from the following is



Options

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

Question Type : **MCQ**
Question ID : **691121589**
Option 1 ID : **6911212010**
Option 2 ID : **6911212011**
Option 3 ID : **6911212009**
Option 4 ID : **6911212008**
Status : **Answered**
Chosen Option : **3**

Q.54 Consider the following reactions in which all the reactants and products are present in gaseous state

$2\,xy \rightleftharpoons x_2 + y_2 \quad K_1 = 2.5 \times 10^5$

$xy + \frac{1}{2} z_2 \rightleftharpoons xyz \quad K_2 = 5 \times 10^{-3}$

The value of K_3 for the equilibrium $\frac{1}{2} x_2 + \frac{1}{2} y_2 + \frac{1}{2} z_2 \rightleftharpoons xyz$ is :

Options

1. 5×10^{-3}
2. 2.5×10^{3}
3. 2.5×10^{-3}
4. 1.0×10^{-5}

Question Type : **MCQ**
Question ID : **691121580**
Option 1 ID : **6911211975**
Option 2 ID : **6911211973**
Option 3 ID : **6911211972**
Option 4 ID : **6911211974**
Status : **Not Answered**
Chosen Option : **--**

Q.55 Given below are two statements :

Statement I : Vapours of the liquid with higher boiling point condense before vapours of the liquid with lower boiling points in fractional distillation.

Statement II : The vapours rising up in the fractionating column become richer in high boiling component of the mixture.

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 : **691121587**
Option 1 ID : **6911212003**
Option 2 ID : **6911212000**
Option 3 ID : **6911212001**
Option 4 ID : **6911212002**
Status : **Not Answered**
Chosen Option : **--**

Q.56 Given below are two statements for catalytic properties of transition metals.

Statement I : First row transition metals which act as catalyst utilise their 3d electrons only for formation of bonds between reactant molecules and atoms on the surface of catalyst.

Statement II : There is increase in the concentration of reactants on the surface of catalyst which strengthens the bonds in reacting molecules.

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

Question Type : **MCQ**
Question ID : **691121586**
Option 1 ID : **6911211997**
Option 2 ID : **6911211996**
Option 3 ID : **6911211998**
Option 4 ID : **6911211999**
Status : **Not Answered**
Chosen Option : **--**

Q.57 Bromine trifluoride autoionizes to form $BrF_2^{\oplus}$ and $BrF_4^{\ominus}$. The shapes of the cation and anion are respectively _____, and _____.

Options

1. linear, square planar
2. bent, square planar
3. linear, tetrahedral
4. bent, see-saw

Question Type : **MCQ**
Question ID : **691121578**
Option 1 ID : **6911211965**
Option 2 ID : **6911211964**
Option 3 ID : **6911211967**
Option 4 ID : **6911211966**
Status : **Answered**
Chosen Option : **4**

Q.58 Given below are two statements :

Given : Molar mass of C, H, O, Cl are 12, 1, 16 and 35.5 g mol^{-1}, respectively

Statement I : In 30% (w/w) solution of methanol in CCl_4(at T K), the mole fraction of CCl_4 is equal to 0.33.

Statement II : Mixture of methanol and CCl_4 shows positive deviation from Raoult's law.

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

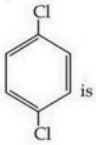
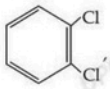
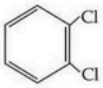
Options

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 : **691121577**
Option 1 ID : **6911211961**
Option 2 ID : **6911211960**
Option 3 ID : **6911211962**
Option 4 ID : **6911211963**
Status : **Not Answered**
Chosen Option : **--**

Q.59 Given below are two statements :

Statement I : Due to increase in van der Waals forces, the order of boiling points is $CH_3CH_2CH_2I > CH_3CH_2I > CH_3I$.

Statement II : As  is more symmetric, its melting point is higher than  , however its boiling point is lower than 

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

Options

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

Question Type : **MCQ**
Question ID : **691121591**
Option 1 ID : **6911212019**
Option 2 ID : **6911212017**
Option 3 ID : **6911212016**
Option 4 ID : **6911212018**
Status : **Not Answered**
Chosen Option : **--**

Q.60 Match **List - I** with **List - II**.

	List - I Electronic configuration of neutral atom (where n = 2)		**List - II** 1st Ionization Energy (kJ mol^{-1})
A.	ns^2	I.	2080
B.	ns^2np^1	II.	899
C.	ns^2np^3	III.	800
D.	ns^2np^6	IV.	1402

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

Options

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

Question Type : **MCQ**
Question ID : **691121583**
Option 1 ID : **6911211986**
Option 2 ID : **6911211985**
Option 3 ID : **6911211987**
Option 4 ID : **6911211984**
Status : **Answered**
Chosen Option : **4**

Q.61 Which statements are **True** ?

A. In Hoffmann bromamide degradation, 4 moles of NaOH and 2 moles of Br_2 are consumed per mole of an amide

B. Hoffmann bromamide reaction is not given by alkyl amides.

C. Primary amines can be synthesized by Hoffmann bromamide degradation.

D. Secondary amide on reaction with Br_2 and NaOH will give secondary amine.

E. The by-products of Hoffmann degradation are Na_2CO_3, NaBr and H_2O.

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

Options

1. C, D and E only

2. C and E only

3. B, C and D only

4. A, C and E only

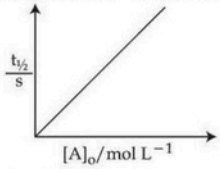
Question Type : **MCQ**
Question ID : **691121593**
Option 1 ID : **6911212027**
Option 2 ID : **6911212026**
Option 3 ID : **6911212025**
Option 4 ID : **6911212024**
Status : **Not Answered**
Chosen Option : **--**

Q.62 Given below are two statements :

$R = 8.314\ J\ K^{-1}\ mol^{-1}$ and $1\ cal = 4.2\ J$

Statement I : When Ea = 12.6 kcal/mol, the room temperature rate constant is doubled by a 10 °C increase in temperature (298 K to 308 K)

Statement II : For a first order reactions $A \rightarrow B$,



Here $[A]_o$ is the initial concentration of A and $t_{1/2}$ is half life of 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 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 : **691121582**
Option 1 ID : **6911211982**
Option 2 ID : **6911211980**
Option 3 ID : **6911211981**
Option 4 ID : **6911211983**
Status : **Answered**
Chosen Option : **1**

Q.63 n-Butane on monochlorination under photochemical condition gives an optically active compound "P". "P" on further chlorination gives dichloro compounds.

The number of dichloro compounds obtained (ignore stereoisomers) is :

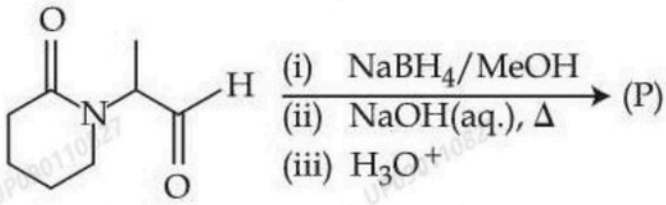
Options

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

Question Type : **MCQ**
Question ID : **691121590**
Option 1 ID : **6911212012**
Option 2 ID : **6911212014**
Option 3 ID : **6911212013**
Option 4 ID : **6911212015**
Status : **Marked For Review**
Chosen Option : **3**

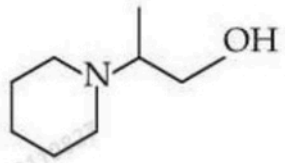
Q.64

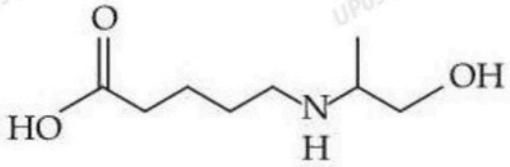
Consider the following reaction.

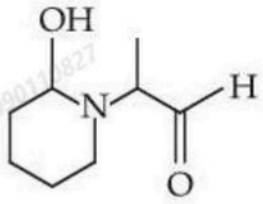


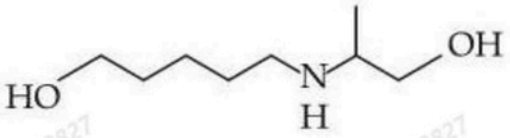
The major product (P) formed is :

Options

1.


2.


3.


4.


Question Type : **MCQ**
Question ID : **691121592**
Option 1 ID : **6911212020**
Option 2 ID : **6911212022**
Option 3 ID : **6911212021**
Option 4 ID : **6911212023**
Status : **Not Answered**
Chosen Option : **--**

Q.65 The **incorrect** statement from the following with respect to carbohydrates is :

Options 1.

Open chain and cyclic structures co-exist at equilibrium that are responsible for certain properties as in the case of D – (+) – glucose.

2.

The monosaccharide units obtained from hydrolysis of oligosaccharides are always the same.

3.

Starch and cellulose are typical examples of polysaccharides, which are very high molecular weight compounds of more than ten monosaccharide units.

4. All monosaccharides are reducing sugars.

Question Type : **MCQ**
Question ID : **691121594**
Option 1 ID : **6911212031**
Option 2 ID : **6911212029**
Option 3 ID : **6911212030**
Option 4 ID : **6911212028**
Status : **Not Answered**
Chosen Option : **--**

Q.66

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

	List - I		**List - II**
	Mass of substance		**Number of atoms**
A.	1.8 mg water	I.	$2\times10^{-4}\times N_A$
B.	9.8 mg sulphuric acid	II.	$1.5\times10^{-4}\times N_A$
C.	1.8 mg carbon	III.	$3\times10^{-4}\times N_A$
D.	5.85 mg salt (NaCl)	IV.	$7\times10^{-4}\times N_A$

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

Options

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

Question Type : **MCQ**
Question ID : **691121576**
Option 1 ID : **6911211959**
Option 2 ID : **6911211957**
Option 3 ID : **6911211958**
Option 4 ID : **6911211956**
Status : **Answered**
Chosen Option : **3**

Q.67 Given below are two statements :

Statement I : The number of pairs among $[Ti^{4+}, V^{2+}]$, $[V^{2+}, Mn^{2+}]$, $[Mn^{2+}, Fe^{3+}]$ and $[V^{2+}, Cr^{2+}]$ in which both ions are coloured is 3.

Statement II : The number of pairs among $[La^{3+}, Yb^{2+}]$, $[Lu^{3+}, Ce^{4+}]$ and $[Ac^{3+}, Lr^{3+}]$ ions in which both are diamagnetic is 3.

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

Options

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

Question Type : **MCQ**
Question ID : **691121585**
Option 1 ID : **6911211993**
Option 2 ID : **6911211992**
Option 3 ID : **6911211994**
Option 4 ID : **6911211995**
Status : **Not Answered**
Chosen Option : **--**

Q.68

Given at 298 K : $E^{\ominus}_{Fe^{2+}/Fe} = X$ Volt

$E^{\ominus}_{Fe^{3+}/Fe} = Y$ Volt

The $E^{\ominus}_{Fe^{3+}/Fe^{2+}}$ in Volt at 298 K is given by :

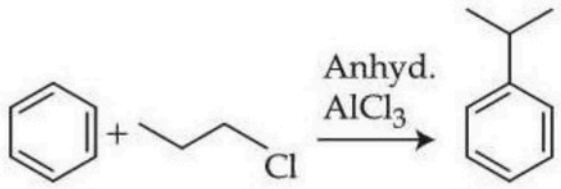
Options

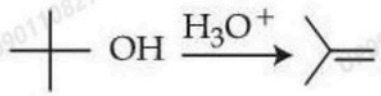
1. $3Y - 2X$
2. $2X - 3Y$
3. $Y + X$
4. $3Y + 2X$

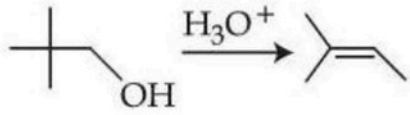
Question Type : **MCQ**
Question ID : **691121581**
Option 1 ID : **6911211977**
Option 2 ID : **6911211976**
Option 3 ID : **6911211979**
Option 4 ID : **6911211978**
Status : **Not Answered**
Chosen Option : **--**

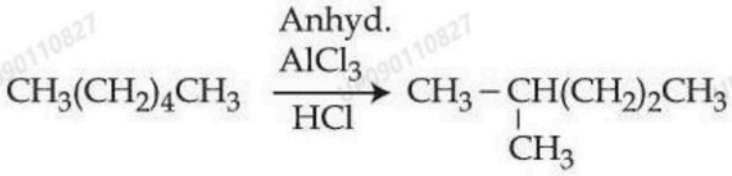
Q.69 The major product of which of the following reaction is not obtained by rearrangement reaction ?

Options

1. 

2. 

3. 

4. 

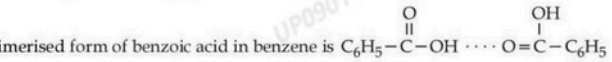
Question Type : **MCQ**
Question ID : **691121588**
Option 1 ID : **6911212004**
Option 2 ID : **6911212005**
Option 3 ID : **6911212007**
Option 4 ID : **6911212006**
Status : **Not Answered**
Chosen Option : **--**

Q.70 Which of the following statements are **not correct** ?

A. For water, magnitude of K_b is more than the magnitude of K_f.

B. The elevation in boiling point of water when a non-volatile solute is added to it is larger in magnitude than its depression in freezing point.

C. Osmotic pressure measurement is **preferred** over any other colligative property to determine molar mass of proteins and polymers.

D. The dimerised form of benzoic acid in benzene is 

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

Options

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

Question Type : **MCQ**
Question ID : **691121579**
Option 1 ID : **6911211969**
Option 2 ID : **6911211971**
Option 3 ID : **6911211970**
Option 4 ID : **6911211968**
Status : **Answered**
Chosen Option : **1**

Section : **Chemistry Section B**

Q.71 Number of paramagnetic complexes among the following is _____.

$[MnBr_4]^{2-}$, $[NiCl_4]^{2-}$, $[Ni(CN)_4]^{2-}$, $[Ni(CO)_4]$, $[CoF_6]^{3-}$, $[Fe(CN)_6]^{4-}$, $[Mn(CN)_6]^{3-}$, $[Ti(CN)_6]^{3-}$, $[Cu(H_2O)_6]^{2+}$, $[Co(C_2O_4)_3]^{3-}$

Given Answer : **10**

Question Type : **SA**
Question ID : **691121596**
Status : **Answered**

Q.72 Solid carbon, CaO and $CaCO_3$ are mixed and allowed to attain equilibrium at T K.

$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ $\quad Kp_1 = 0.08$ atm

$C(s) + CO_2(g) \rightleftharpoons 2CO(g)$ $\quad Kp_2 = 2$ atm

The partial pressure of CO is _____ $\times 10^{-1}$ atm

Given Answer : **--**

Question Type : **SA**
Question ID : **691121600**
Status : **Not Answered**

Q.73 Consider the reaction

$2H_2S(g) + 3O_2(g) \rightarrow 2H_2O(l) + 2SO_2(g)$

The magnitude of enthalpy change for the reaction in kJ mol^{-1} is _____. (Nearest integer)

Given : $\Delta_f H^{\ominus}(H_2S) = -20.1\ kJ\ mol^{-1}$

$\Delta_f H^{\ominus}(H_2O) = -286.0\ kJ\ mol^{-1}$

$\Delta_f H^{\ominus}(SO_2) = -297.0\ kJ\ mol^{-1}$

Given --
Answer :

Question Type : **SA**
Question ID : **691121599**
Status : **Not Answered**

Q.74 '*x*' is the product which is obtained from benzene by reacting it with carbon monoxide and hydrogen chloride in the presence of cuprous chloride. '*y*' is the major product obtained from the benzene by reacting it with ethanoyl chloride in the presence of anhydrous $AlCl_3$. Product (major) obtained by heating *x* and *y* in the presence of alkali is *z*. Total number of π (pi) electrons in *z* is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **691121597**
Status : **Not Answered**

Q.75 Consider two radiations of wavelengths

1. $\lambda_1 = 2000$ Å
2. $\lambda_2 = 6000$ Å

The ratio of the energies of these two radiations $\left(\frac{E_1}{E_2}\right)$ is _____ (Nearest integer).

Given **3**
Answer :

Question Type : **SA**
Question ID : **691121598**
Status : **Marked For Review**

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	3	14	0	3	0
Mathematics Section B	5	0	5	0	0	0
Physics Section A	20	3	10	0	7	0
Physics Section B	5	0	5	0	0	0
Chemistry Section A	20	6	12	0	2	0
Chemistry Section B	5	1	3	0	1	0

"