Q.2 Let α, β, γ and δ be the coefficients of x^7, x^5, x^3 and x respectively in the expansion of

$\left(x+\sqrt{x^3-1}\right)^5+\left(x-\sqrt{x^3-1}\right)^5, x>1$. If u and v satisfy the equations

$\alpha u+\beta v=18,$

$\gamma u+\delta v=20,$

then $u+v$ equals :

Options

1. 4
2. 8
3. 3
4. 5

Question Type : **MCQ**
Question ID : **656445233**
Option 1 ID : **656445795**
Option 2 ID : **656445797**
Option 3 ID : **656445794**
Option 4 ID : **656445796**
Status : **Not Answered**
Chosen Option : **--**

Q.3 Let $f(x)=\int_0^{x^2} \frac{t^2-8t+15}{e^t} dt, x \in \mathbf{R}$. Then the numbers of local maximum and local minimum points of f, respectively, are :

Options

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

Question Type : **MCQ**
Question ID : **656445242**
Option 1 ID : **656445830**
Option 2 ID : **656445831**
Option 3 ID : **656445833**
Option 4 ID : **656445832**
Status : **Not Answered**
Chosen Option : **--**

Q.4 Let $A = \{1, 2, 3, 4\}$ and $B = \{1, 4, 9, 16\}$. Then the number of many-one functions $f : A \to B$ such that $1 \in f(A)$ is equal to :

Options

1. 127
2. 139
3. 163
4. 151

Question Type : **MCQ**
Question ID : **656445226**
Option 1 ID : **656445766**
Option 2 ID : **656445767**
Option 3 ID : **656445769**
Option 4 ID : **656445768**
Status : **Not Answered**
Chosen Option : **--**

Q.5 The perpendicular distance, of the line $\frac{x-1}{2} = \frac{y+2}{-1} = \frac{z+3}{2}$ from the point $P(2, -10, 1)$, is :

Options

1. $4\sqrt{3}$
2. $5\sqrt{2}$
3. $3\sqrt{5}$
4. 6

Question Type : **MCQ**
Question ID : **656445239**
Option 1 ID : **656445819**
Option 2 ID : **656445821**
Option 3 ID : **656445820**
Option 4 ID : **656445818**
Status : **Answered**
Chosen Option : **3**

Q.6 Suppose that the number of terms in an A.P. is 2k, kϵ**N**. If the sum of all odd terms of the A.P. is 40, the sum of all even terms is 55 and the last term of the A.P. exceeds the first term by 27, then k is equal to :

Options

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

Question Type : **MCQ**
Question ID : **656445231**
Option 1 ID : **656445789**
Option 2 ID : **656445788**
Option 3 ID : **656445787**
Option 4 ID : **656445786**
Status : **Answered**
Chosen Option : **3**

Q.7 Let $\vec{a}$ and $\vec{b}$ be two unit vectors such that the angle between them is $\frac{\pi}{3}$. If $\lambda\vec{a}+2\vec{b}$ and $3\vec{a}-\lambda\vec{b}$ are perpendicular to each other, then the number of values of λ in $[-1, 3]$ is :

Options

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

Question Type : **MCQ**
Question ID : **656445238**
Option 1 ID : **656445816**
Option 2 ID : **656445814**
Option 3 ID : **656445817**
Option 4 ID : **656445815**
Status : **Not Answered**
Chosen Option : **--**

Q.8 Let $P(4, 4\sqrt{3})$ be a point on the parabola $y^2=4ax$ and PQ be a focal chord of the parabola. If M and N are the foot of perpendiculars drawn from P and Q respectively on the directrix of the parabola, then the area of the quadrilateral PQMN is equal to :

Options

1. $\frac{263\sqrt{3}}{8}$

2. $\frac{343\sqrt{3}}{8}$

3. $\frac{34\sqrt{3}}{3}$

4. $17\sqrt{3}$

Question Type : **MCQ**
Question ID : **656445235**
Option 1 ID : **656445805**
Option 2 ID : **656445803**
Option 3 ID : **656445804**
Option 4 ID : **656445802**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.9

If $\int e^x \left(\frac{x \sin^{-1} x}{\sqrt{1-x^2}} + \frac{\sin^{-1} x}{(1-x^2)^{3/2}} + \frac{x}{1-x^2} \right) dx = g(x) + C$, where C is the constant of integration,

then $g\left(\frac{1}{2}\right)$ equals :

Options

1. $\frac{\pi}{6}\sqrt{\frac{e}{3}}$

2. $\frac{\pi}{4}\sqrt{\frac{e}{2}}$

3. $\frac{\pi}{4}\sqrt{\frac{e}{3}}$

4. $\frac{\pi}{6}\sqrt{\frac{e}{2}}$

Question Type : **MCQ**
Question ID : **656445245**
Option 1 ID : **656445844**
Option 2 ID : **656445842**
Option 3 ID : **656445845**
Option 4 ID : **656445843**
Status : **Not Answered**
Chosen Option : **--**

Q.10 If A and B are two events such that $P(A \cap B)=0.1$, and $P(A|B)$ and $P(B|A)$ are the roots of the equation $12x^2-7x+1=0$, then the value of $\frac{P(\overline{A} \cup \overline{B})}{P(\overline{A} \cap \overline{B})}$ is :

Options

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

Question Type : **MCQ**
Question ID : **656445234**
Option 1 ID : **656445798**
Option 2 ID : **656445800**
Option 3 ID : **656445799**
Option 4 ID : **656445801**
Status : **Not Answered**
Chosen Option : **--**

Q.11 Let the curve $z(1+i)+\overline{z}(1-i)=4$, $z \in C$, divide the region $|z-3| \leq 1$ into two parts of areas α and β. Then $|\alpha-\beta|$ equals :

Options

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

Question Type : **MCQ**
Question ID : **656445228**
Option 1 ID : **656445776**
Option 2 ID : **656445774**
Option 3 ID : **656445775**
Option 4 ID : **656445777**
Status : **Not Answered**
Chosen Option : **--**

Q.12

The sum of all values of $\theta \in [0, 2\pi]$ satisfying $2\sin^2\theta = \cos 2\theta$ and $2\cos^2\theta = 3\sin\theta$ is

Options

1. $\frac{\pi}{2}$
2. 4π
3. π
4. $\frac{5\pi}{6}$

Question Type : **MCQ**
Question ID : **656445237**
Option 1 ID : **656445811**
Option 2 ID : **656445813**
Option 3 ID : **656445812**
Option 4 ID : **656445810**
Status : **Answered**
Chosen Option : **3**

Q.13

If $x = f(y)$ is the solution of the differential equation

$$\left(1 + y^2\right) + \left(x - 2e^{\tan^{-1} y}\right)\frac{dy}{dx} = 0, y \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$

with $f(0) = 1$, then $f\left(\frac{1}{\sqrt{3}}\right)$ is equal to :

Options

1. $e^{\pi/3}$
2. $e^{\pi/12}$
3. $e^{\pi/6}$
4. $e^{\pi/4}$

Question Type : **MCQ**
Question ID : **656445244**
Option 1 ID : **656445840**
Option 2 ID : **656445839**
Option 3 ID : **656445838**
Option 4 ID : **656445841**
Status : **Not Answered**
Chosen Option : **--**

Q.14

If $\lim\limits_{x\to\infty}\left(\left(\frac{e}{1-e}\right)\left(\frac{1}{e}-\frac{x}{1+x}\right)\right)^{x}=\alpha$, then the value of $\frac{\log_e\alpha}{1+\log_e\alpha}$ equals :

Options

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

Question Type : **MCQ**
Question ID : **656445241**
Option 1 ID : **656445829**
Option 2 ID : **656445826**
Option 3 ID : **656445827**
Option 4 ID : **656445828**
Status : **Not Answered**
Chosen Option : **--**

Q.15

Let $E:\frac{x^2}{a^2}+\frac{y^2}{b^2}=1, a>b$ and $H:\frac{x^2}{A^2}-\frac{y^2}{B^2}=1$. Let the distance between the foci of E and the foci of H be $2\sqrt{3}$. If $a-A=2$, and the ratio of the eccentricities of E and H is $\frac{1}{3}$, then the sum of the lengths of their latus rectums is equal to :

Options

1. 9
2. 10
3. 8
4. 7

Question Type : **MCQ**
Question ID : **656445236**
Option 1 ID : **656445808**
Option 2 ID : **656445809**
Option 3 ID : **656445807**
Option 4 ID : **656445806**
Status : **Not Answered**
Chosen Option : **--**

Q.16 The area of the region enclosed by the curves $y=x^2-4x+4$ and $y^2=16-8x$ is :

Options

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

Question Type : **MCQ**
Question ID : **656445243**
Option 1 ID : **656445834**
Option 2 ID : **656445836**
Option 3 ID : **656445837**
Option 4 ID : **656445835**
Status : **Not Attempted and Marked For Review**
Chosen Option : --

Q.17 If the system of linear equations :

$x+y+2z=6,$

$2x+3y+az=a+1,$

$-x-3y+bz=2b,$

where a, b ϵ **R**, has infinitely many solutions, then $7a+3b$ is equal to :

Options

1. 22
2. 16
3. 9
4. 12

Question Type : **MCQ**
Question ID : **656445229**
Option 1 ID : **656445781**
Option 2 ID : **656445780**
Option 3 ID : **656445778**
Option 4 ID : **656445779**
Status : **Answered**
Chosen Option : **2**

Q.18 In a group of 3 girls and 4 boys, there are two boys B_1 and B_2. The number of ways, in which these girls and boys can stand in a queue such that all the girls stand together, all the boys stand together, but B_1 and B_2 are not adjacent to each other, is :

Options

1. 144
2. 120
3. 72
4. 96

Question Type : **MCQ**
Question ID : **656445232**
Option 1 ID : **656445793**
Option 2 ID : **656445792**
Option 3 ID : **656445790**
Option 4 ID : **656445791**
Status : **Answered**
Chosen Option : **3**

Q.19 Let a line pass through two distinct points P(−2, −1, 3) and Q, and be parallel to the vector $3\hat{i} + 2\hat{j} + 2\hat{k}$. If the distance of the point Q from the point R(1, 3, 3) is 5, then the square of the area of ΔPQR is equal to :

Options

1. 148
2. 144
3. 140
4. 136

Question Type : **MCQ**
Question ID : **656445240**
Option 1 ID : **656445825**
Option 2 ID : **656445824**
Option 3 ID : **656445823**
Option 4 ID : **656445822**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.20 For a 3×3 matrix M, let trace (M) denote the sum of all the diagonal elements of M. Let A be a 3×3 matrix such that $|A| = \frac{1}{2}$ and trace $(A)=3$. If $B=\text{adj}(\text{adj}(2A))$, then the value of $|B|+\text{trace }(B)$ equals :

Options

1. 132
2. 56
3. 174
4. 280

Question Type : **MCQ**
Question ID : **656445230**
Option 1 ID : **656445784**
Option 2 ID : **656445782**
Option 3 ID : **656445785**
Option 4 ID : **656445783**
Status : **Not Answered**
Chosen Option : **--**

Section : **Mathematics Section B**

Q.21 Let A(6, 8), B(10 cosα, −10 sinα) and C (−10 sinα, 10 cosα), be the vertices of a triangle. If L(a, 9) and G(h, k) be its orthocenter and centroid respectively, then $(5a-3h+6k+100\sin2\alpha)$ is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **656445247**
Status : **Not Attempted and Marked For Review**

Q.22 Let $y=f(x)$ be the solution of the differential equation $\frac{dy}{dx}+\frac{xy}{x^2-1}=\frac{x^6+4x}{\sqrt{1-x^2}}$, $-1<x<1$ such that $f(0)=0$. If $6\int_{-1/2}^{1/2} f(x)dx = 2\pi-\alpha$ then α^2 is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **656445248**
Status : **Not Answered**

Q.23 Let the distance between two parallel lines be 5 units and a point P lie between the lines at a unit distance from one of them. An equilateral triangle PQR is formed such that Q lies on one of the parallel lines, while R lies on the other. Then $(QR)^2$ is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **656445249**
Status : **Not Answered**

Q.24 If $\sum_{r=1}^{30} \frac{r^2\left({}^{30}C_r\right)^2}{{}^{30}C_{r-1}} = \alpha \times 2^{29}$, then α is equal to _____.

Given Answer : --

Question Type : **SA**
Question ID : **656445246**
Status : **Not Answered**

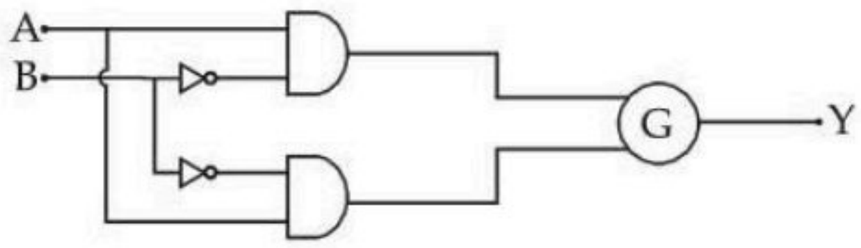
Q.25 Let $A = \{1, 2, 3\}$. The number of relations on A, containing (1, 2) and (2, 3), which are reflexive and transitive but not symmetric, is _____.

Given Answer : --

Question Type : **SA**
Question ID : **656445250**
Status : **Not Answered**

Section : **Physics Section A**

Q.26



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

To obtain the given truth table, following logic gate should be placed at G :

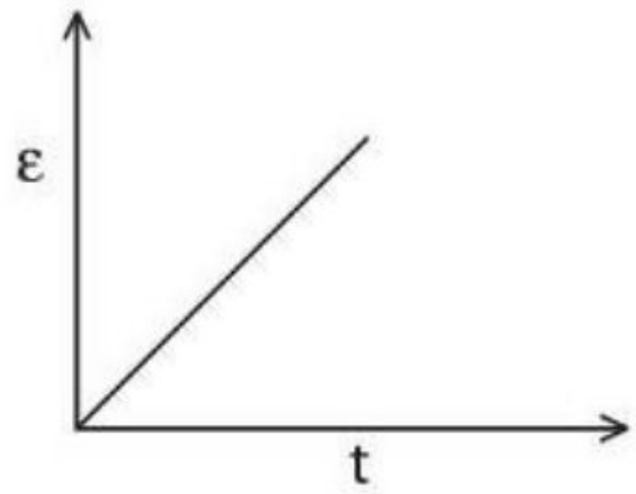
Options

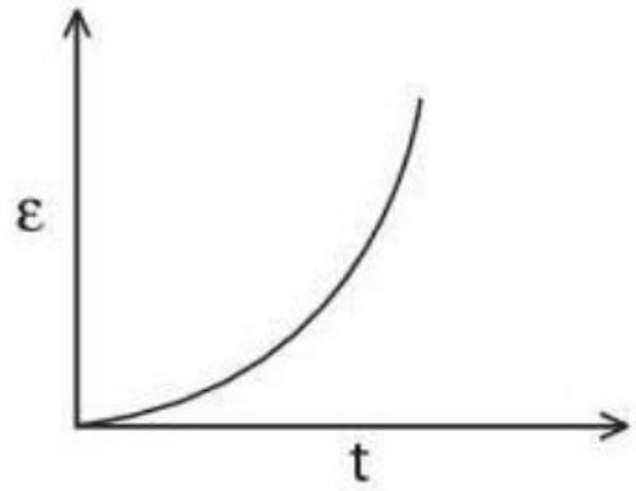
1. AND Gate
2. OR Gate
3. NOR Gate
4. NAND Gate

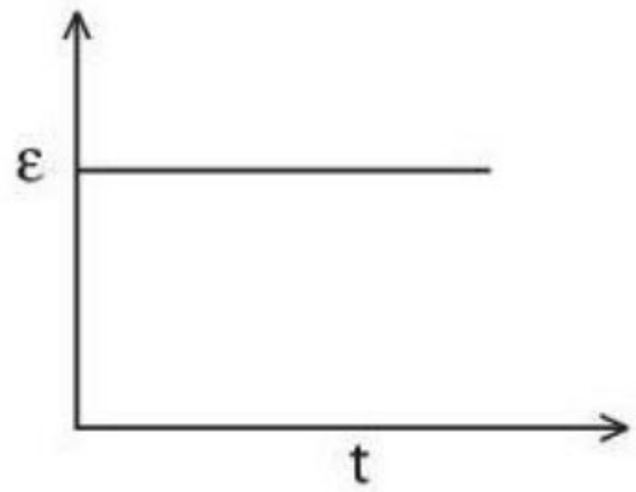
Question Type : **MCQ**
Question ID : **656445270**
Option 1 ID : **656445930**
Option 2 ID : **656445929**
Option 3 ID : **656445927**
Option 4 ID : **656445928**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

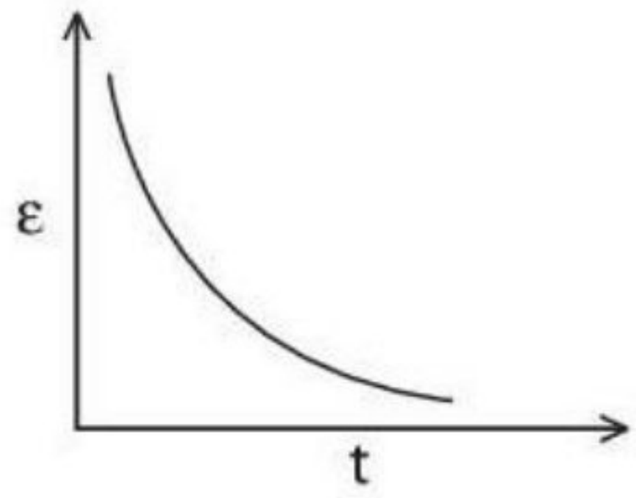
Q.27 A rectangular metallic loop is moving out of a uniform magnetic field region to a field free region with a constant speed. When the loop is partially inside the magnate field, the plot of magnitude of induced emf (ε) with time (t) is given by

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **656445263**
Option 1 ID : **656445900**
Option 2 ID : **656445902**
Option 3 ID : **656445899**
Option 4 ID : **656445901**
Status : **Not Answered**
Chosen Option : **--**

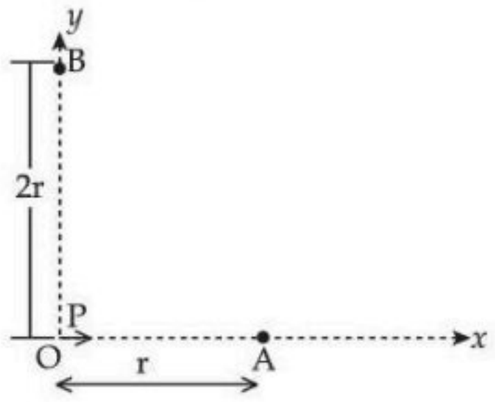
Q.28 A light source of wavelength λ illuminates a metal surface and electrons are ejected with maximum kinetic energy of 2 eV. If the same surface is illuminated by a light source of wavelength $\frac{\lambda}{2}$, then the maximum kinetic energy of ejected electrons will be (The work function of metal is 1 eV)

Options

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

Question Type : **MCQ**
Question ID : **656445268**
Option 1 ID : **656445922**
Option 2 ID : **656445921**
Option 3 ID : **656445919**
Option 4 ID : **656445920**
Status : **Answered**
Chosen Option : **2**

Q.29 For a short dipole placed at origin O, the dipole moment P is along *x*-axis, as shown in the figure. If the electric potential and electric field at A are V_0 and E_0, respectively, then the correct combination of the electric potential and electric field, respectively, at point B on the *y*-axis is given by



Options

1. V_0 and $\frac{E_0}{4}$
2. zero and $\frac{E_0}{16}$
3. $\frac{V_0}{2}$ and $\frac{E_0}{16}$
4. zero and $\frac{E_0}{8}$

Question Type : **MCQ**
Question ID : **656445262**
Option 1 ID : **656445896**
Option 2 ID : **656445898**
Option 3 ID : **656445897**
Option 4 ID : **656445895**
Status : **Answered**
Chosen Option : **2**

Q.30 An electron projected perpendicular to a uniform magnetic field B moves in a circle. If Bohr's quantization is applicable, then the radius of the electronic orbit in the first excited state is :

Options

1. $\sqrt{\frac{2h}{\pi eB}}$

2. $\sqrt{\frac{4h}{\pi eB}}$

3. $\sqrt{\frac{h}{\pi eB}}$

4. $\sqrt{\frac{h}{2\pi eB}}$

Question Type : **MCQ**
Question ID : **656445269**
Option 1 ID : **656445924**
Option 2 ID : **656445926**
Option 3 ID : **656445923**
Option 4 ID : **656445925**
Status : **Marked For Review**
Chosen Option : **4**

Q.31 Given below are two statements. One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : In Young's double slit experiment, the fringes produced by red light are closer as compared to those produced by blue light.

Reason (R) : The fringe width is directly proportional to the wavelength of light.

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

Options

1. Both **(A)** and **(R)** are true but **(R)** is **NOT** the correct explanation of **(A)**

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

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

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

Question Type : **MCQ**
Question ID : **656445265**
Option 1 ID : **656445908**
Option 2 ID : **656445910**
Option 3 ID : **656445907**
Option 4 ID : **656445909**
Status : **Not Answered**
Chosen Option : **--**

Q.32 The maximum percentage error in the measurment of density of a wire is

[Given, mass of wire $= (0.60 \pm 0.003)$g

radius of wire $= (0.50 \pm 0.01)$cm

length of wire $= (10.00 \pm 0.05)$cm]

Options

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

Question Type : **MCQ**
Question ID : **656445252**
Option 1 ID : **656445856**
Option 2 ID : **656445857**
Option 3 ID : **656445858**
Option 4 ID : **656445855**
Status : **Answered**
Chosen Option : **2**

Q.33 Given are statements for certain thermodynamic variables,

(A) Internal energy, volume (V) and mass (M) are extensive variables.

(B) Pressure (P), temperature (T) and density (ρ) are intensive variables.

(C) Volume (V), temperature (T) and density (ρ) are intensive variables.

(D) Mass (M), temperature (T) and internal energy are extensive variables.

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

Options

1. (B) and (C) Only
2. (C) and (D) Only
3. (D) and (A) Only
4. (A) and (B) Only

Question Type : **MCQ**
Question ID : **656445260**
Option 1 ID : **656445888**
Option 2 ID : **656445889**
Option 3 ID : **656445890**
Option 4 ID : **656445887**
Status : **Answered**
Chosen Option : **4**

Q.34

The torque due to the force $\left(2\hat{i} + \hat{j} + 2\hat{k}\right)$ about the origin, acting on a particle whose position vector is $\left(\hat{i} + \hat{j} + \hat{k}\right)$, would be

Options

1. $\hat{i} - \hat{k}$
2. $\hat{i} - \hat{j} + \hat{k}$
3. $\hat{i} + \hat{k}$
4. $\hat{j} + \hat{k}$

Question Type : **MCQ**
Question ID : **656445253**
Option 1 ID : **656445859**
Option 2 ID : **656445861**
Option 3 ID : **656445862**
Option 4 ID : **656445860**
Status : **Answered**
Chosen Option : **1**

Q.35 Which one of the following is the correct dimensional formula for the capacitance in F ? M, L, T and C stand for unit of mass, length, time and charge,

Options

1. $[F] = [CM^{-1} L^{-2} T^{2}]$
2. $[F] = [C^{2}M^{-1} L^{-2} T^{2}]$
3. $[F] = [C^{2}M^{-2} L^{2} T^{2}]$
4. $[F] = [CM^{-2} L^{-2} T^{-2}]$

Question Type : **MCQ**
Question ID : **656445251**
Option 1 ID : **656445851**
Option 2 ID : **656445854**
Option 3 ID : **656445853**
Option 4 ID : **656445852**
Status : **Answered**
Chosen Option : **2**

Q.36 A transparent film of refractive index, 2.0 is coated on a glass slab of refractive index, 1.45. What is the minimum thickness of transparent film to be coated for the maximum transmission of Green light of wavelength 550 nm. [Assume that the light is incident nearly perpendicular to the glass surface.]

Options

1. 94.8 nm

2. 275 nm

3. 137.5 nm

4. 68.7 nm

Question Type : **MCQ**
Question ID : **656445266**
Option 1 ID : **656445914**
Option 2 ID : **656445913**
Option 3 ID : **656445912**
Option 4 ID : **656445911**
Status : **Not Answered**
Chosen Option : **--**

Q.37 Given below are two statements. One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : A simple pendulum is taken to a planet of mass and radius, 4 times and 2 times, respectively, than the Earth. The time period of the pendulum remains same on earth and the planet.

Reason (R) : The mass of the pendulum remains unchanged at Earth and the other planet.

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

Options

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

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

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

4. Both **(A)** and **(R)** are true but **(R)** is **NOT** the correct explanation of **(A)**

Question Type : **MCQ**
Question ID : **656445261**
Option 1 ID : **656445894**
Option 2 ID : **656445891**
Option 3 ID : **656445893**
Option 4 ID : **656445892**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

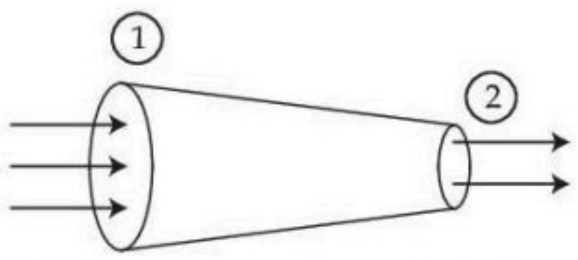
Q.38 A small rigid spherical ball of mass M is dropped in a long vertical tube containing glycerine. The velocity of the ball becomes constant after some time. If the density of glycerine is half of the density of the ball, then the viscous force acting on the ball will be
(consider g as acceleration due to gravity)

Options

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

Question Type : **MCQ**
Question ID : **656445258**
Option 1 ID : **656445881**
Option 2 ID : **656445879**
Option 3 ID : **656445882**
Option 4 ID : **656445880**
Status : **Not Answered**
Chosen Option : **--**

Q.39



A tube of length L is shown in the figure. The radius of cross section at the point (1) is 2 cm and at the point (2) is 1 cm, respectively. If the velocity of water entering at point (1) is 2 m/s, then velocity of water leaving the point (2) will be

Options

1. $4\ m/s$
2. $6\ m/s$
3. $8\ m/s$
4. $2\ m/s$

Question Type : **MCQ**
Question ID : **656445257**
Option 1 ID : **656445877**
Option 2 ID : **656445875**
Option 3 ID : **656445876**
Option 4 ID : **656445878**
Status : **Answered**
Chosen Option : **3**

Q.40 A force $\vec{F} = 2\hat{i} + b\hat{j} + \hat{k}$ is applied on a particle and it undergoes a displacement $\hat{i} - 2\hat{j} - \hat{k}$. What will be the value of b, if work done on the particle is zero.

Options

1. 2
2. $\frac{1}{2}$
3. 0
4. $\frac{1}{3}$

Question Type : **MCQ**
Question ID : **656445256**
Option 1 ID : **656445874**
Option 2 ID : **656445871**
Option 3 ID : **656445872**
Option 4 ID : **656445873**
Status : **Answered**
Chosen Option : **2**

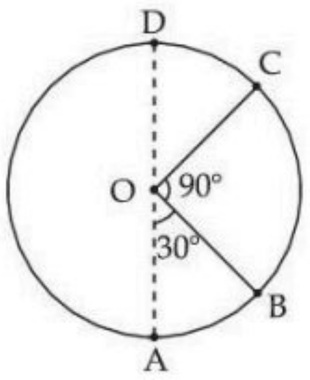
Q.41 A ball of mass 100 g is projected with velocity 20 m/s at 60° with horizontal. The decrease in kinetic energy of the ball during the motion from point of projection to highest point is

Options

1. zero
2. 5 J
3. 20 J
4. 15 J

Question Type : **MCQ**
Question ID : **656445254**
Option 1 ID : **656445863**
Option 2 ID : **656445866**
Option 3 ID : **656445865**
Option 4 ID : **656445864**
Status : **Answered**
Chosen Option : **4**

Q.42 A body of mass 100 g is moving in circular path of radius 2 m on vertical plane as shown in figure. The velocity of the body at point A is 10 m/s. The ratio of its kinetic energies at point B and C is :



(Take acceleration due to gravity as 10 m/s^2)

Options

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

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

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

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

Question Type : **MCQ**
Question ID : **656445255**
Option 1 ID : **656445869**
Option 2 ID : **656445868**
Option 3 ID : **656445867**
Option 4 ID : **656445870**
Status : **Answered**
Chosen Option : **1**

Q.43

For a diatomic gas, if $\gamma_1 = \left(\frac{Cp}{Cv}\right)$ for rigid molecules and $\gamma_2 = \left(\frac{Cp}{Cv}\right)$ for another diatomic molecules, but also having vibrational modes. Then, which one of the following options is correct ?
(Cp and Cv are specific heats of the gas at constant pressure and volume)

Options

1. $\gamma_2 = \gamma_1$
2. $\gamma_2 > \gamma_1$
3. $2\gamma_2 = \gamma_1$
4. $\gamma_2 < \gamma_1$

Question Type : **MCQ**
Question ID : **656445259**
Option 1 ID : **656445885**
Option 2 ID : **656445883**
Option 3 ID : **656445886**
Option 4 ID : **656445884**
Status : **Answered**
Chosen Option : **4**

Q.44

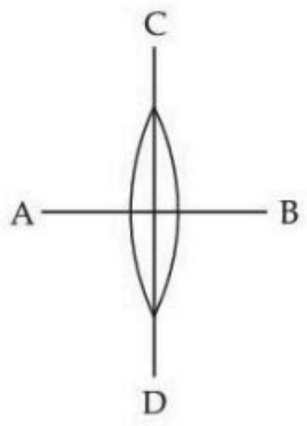
A series LCR circuit is connected to an alternating source of emf E. The current amplitude at resonant frequency is I_0. If the value of resistance R becomes twice of its initial value then amplitude of current at resonance will be

Options

1. $\frac{I_0}{2}$
2. $2I_0$
3. I_0
4. $\frac{I_0}{\sqrt{2}}$

Question Type : **MCQ**
Question ID : **656445264**
Option 1 ID : **656445904**
Option 2 ID : **656445905**
Option 3 ID : **656445903**
Option 4 ID : **656445906**
Status : **Marked For Review**
Chosen Option : **2**

Q.45 A symmetric thin biconvex lens is cut into four equal parts by two planes AB and CD as shown in figure. If the power of original lens is 4D then the power of a part of the divided lens is



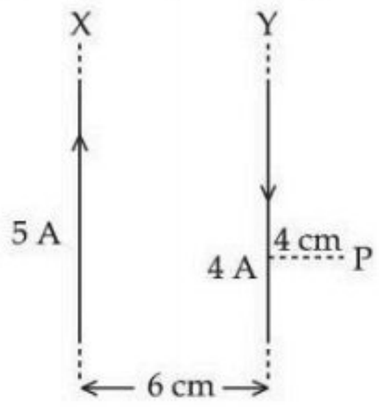
Options

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

Question Type : **MCQ**
Question ID : **656445267**
Option 1 ID : **656445918**
Option 2 ID : **656445915**
Option 3 ID : **656445917**
Option 4 ID : **656445916**
Status : **Marked For Review**
Chosen Option : **3**

Section : **Physics Section B**

Q.46 Two long parallel wires X and Y, separated by a distance of 6 cm, carry currents of 5A and 4A, respectively, in opposite directions as shown in the figure. Magnitude of the resultant magnetic field at point P at a distance of 4 cm from wire Y is $x \times 10^{-5}$ T. The value of x is _____. Take permeability of free space as $\mu_0 = 4\pi \times 10^{-7}$ SI units.



Given Answer : --

Question Type : **SA**
Question ID : **656445273**
Status : **Not Answered**

Q.47 A tube of length 1m is filled completely with an ideal liquid of mass 2M, and closed at both ends. The tube is rotated uniformly in horizontal plane about one of its ends. If the force exerted by the liquid at the other end is F then angular velocity of the tube is $\sqrt{\frac{F}{\alpha M}}$ in SI unit. The value of α is _____.

Given Answer : --

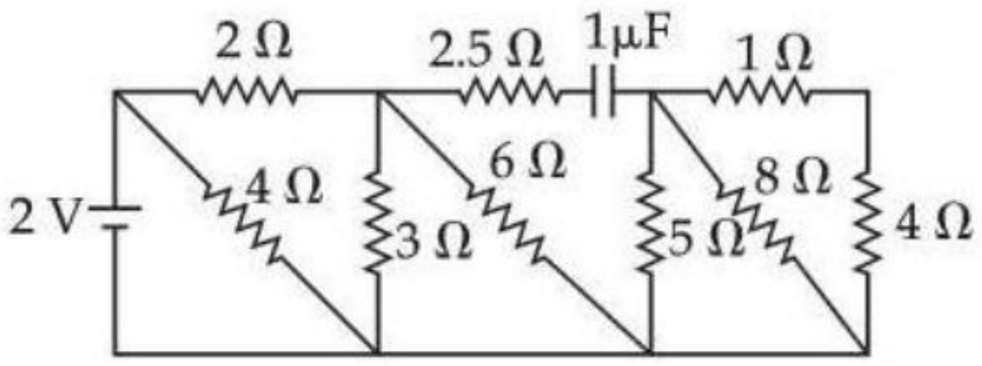
Question Type : **SA**
Question ID : **656445271**
Status : **Not Answered**

Q.48 A proton is moving undeflected in a region of crossed electric and magnetic fields at a constant speed of 2×10^5 ms^{-1}. When the electric field is switched off, the proton moves along a circular path of radius 2 cm. The magnitude of electric field is $x\times10^4$ N/C. The value of x is _____. Take the mass of the proton $=1.6\times10^{-27}$ kg.

Given Answer : --

Question Type : **SA**
Question ID : **656445274**
Status : **Not Answered**

Q.49 The net current flowing in the given circuit is _____ A.



Given Answer : **1.00**

Question Type : **SA**
Question ID : **656445272**
Status : **Answered**

Q.50 A parallel plate capacitor of area $A = 16\ cm^2$ and separation between the plates 10 cm, is charged by a DC current. Consider a hypothetical plane surface of area $A_0 = 3.2\ cm^2$ inside the capacitor and parallel to the plates. At an instant, the current through the circuit is 6A. At the same instant the displacement current through A_0 is _____ mA.

Given Answer : --

Question Type : **SA**

Question ID : **656445275**

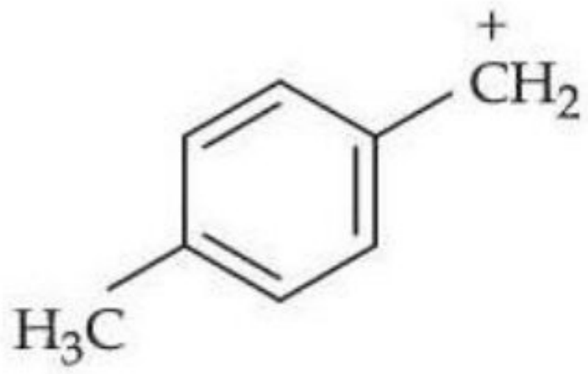
Status : **Not Attempted and Marked For Review**

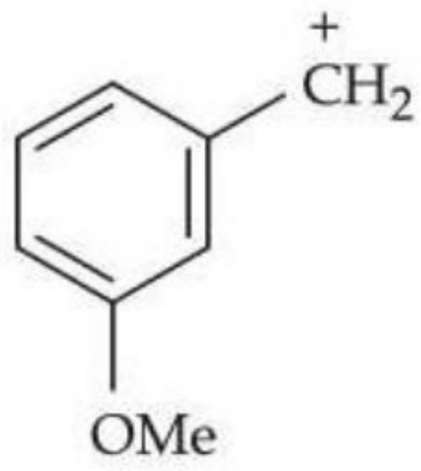
Section : **Chemistry Section A**

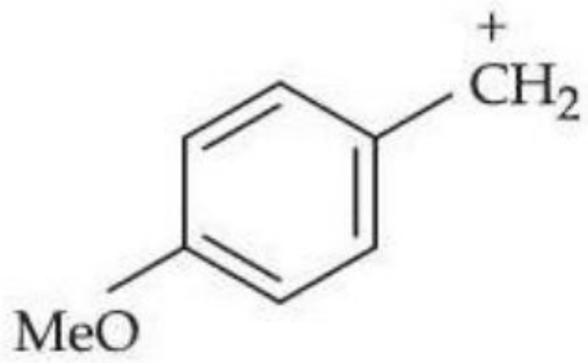
Q.51

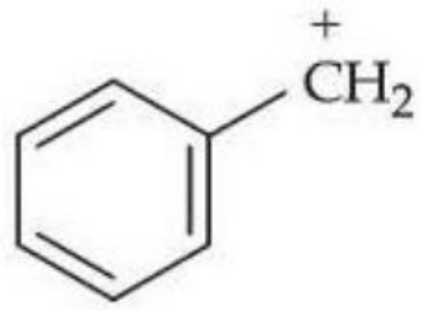
The most stable carbocation from the following is :

Options

1. 

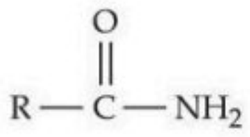
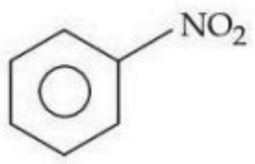
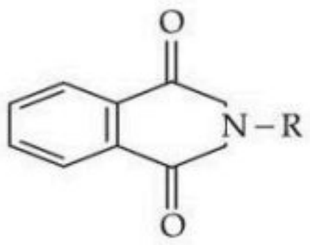
2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **656445290**
Option 1 ID : **656445994**
Option 2 ID : **656445995**
Option 3 ID : **656445993**
Option 4 ID : **656445992**
Status : **Answered**
Chosen Option : **3**

Q.52 Match the Compounds **(List - I)** with the appropriate Catalyst/ Reagents **(List - II)** for their reduction into corresponding amines.

List - I (Compounds)		**List - II (Catalyst/Reagents)**	
(A)		(I)	NaOH (aqueous)
(B)		(II)	H_2/Ni
(C)	$R-C\equiv N$	(III)	$LiAlH_4$, H_2O
(D)		(IV)	Sn, HCl

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

Options

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

Question Type : **MCQ**
Question ID : **656445294**
Option 1 ID : **6564451010**
Option 2 ID : **6564451011**
Option 3 ID : **6564451008**
Option 4 ID : **6564451009**
Status : **Answered**
Chosen Option : **4**

Q.53 Given below are two statements :

Statement (I) : Corrosion is an electrochemical phenomenon in which pure metal acts as an anode and impure metal as a cathode.

Statement (II) : The rate of corrosion is more in alkaline medium than in acidic medium.

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

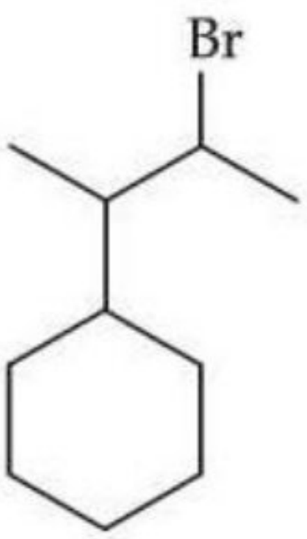
Options

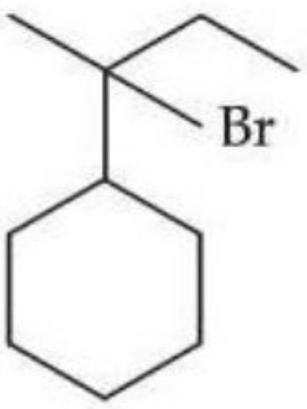
1. Both **Statement I** and **Statement II** are false
2. **Statement I** is true but **Statement II** is false
3. Both **Statement I** and **Statement II** are true
4. **Statement I** is false but **Statement II** is true

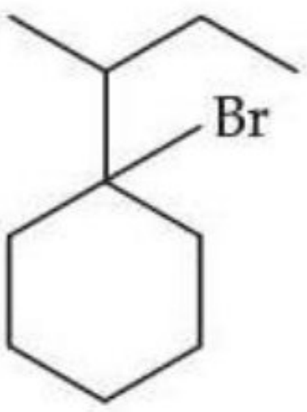
Question Type : **MCQ**
Question ID : **656445278**
Option 1 ID : **656445945**
Option 2 ID : **656445946**
Option 3 ID : **656445944**
Option 4 ID : **656445947**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

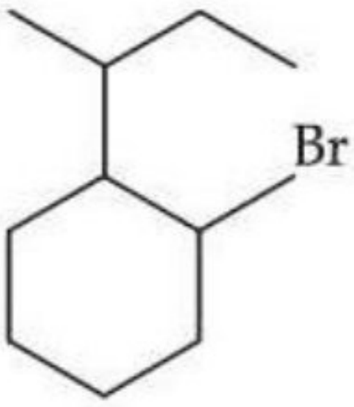
Q.54 When sec-butylcyclohexane reacts with bromine in the presence of sunlight, the major product is :

Options

1. 

2. 

3. 

4. 

Question Type : **MCQ**
Question ID : **656445289**
Option 1 ID : **656445990**
Option 2 ID : **656445988**
Option 3 ID : **656445989**
Option 4 ID : **656445991**
Status : **Answered**
Chosen Option : **2**

Q.55 The molar solubility(s) of zirconium phosphate with molecular formula $(Zr^{4+})_3\ (PO_4^{3-})_4$ is given by relation :

Options

1. $\left(\frac{K_{sp}}{9612}\right)^{\frac{1}{3}}$

2. $\left(\frac{K_{sp}}{6912}\right)^{\frac{1}{7}}$

3. $\left(\frac{K_{sp}}{5348}\right)^{\frac{1}{6}}$

4. $\left(\frac{K_{sp}}{8435}\right)^{\frac{1}{7}}$

Question Type : **MCQ**
Question ID : **656445277**
Option 1 ID : **656445940**
Option 2 ID : **656445941**
Option 3 ID : **656445942**
Option 4 ID : **656445943**
Status : **Answered**
Chosen Option : **2**

Q.56

Identify the homoleptic complex(es) that is/are low spin.

(A) $[Fe(CN)_5NO]^{2-}$

(B) $[CoF_6]^{3-}$

(C) $[Fe(CN)_6]^{4-}$

(D) $[Co(NH_3)_6]^{3+}$

(E) $[Cr(H_2O)_6]^{2+}$

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

Options

1. (C) and (D) only

2. (B) and (E) only

3. (A) and (C) only

4. (C) only

Question Type : **MCQ**
Question ID : **656445286**
Option 1 ID : **656445976**
Option 2 ID : **656445978**
Option 3 ID : **656445977**
Option 4 ID : **656445979**
Status : **Answered**
Chosen Option : **1**

Q.57

$$RBr \xrightarrow[(ii)\ H_2O]{(i)\ Mg,\ dry\ ether} \text{2 - Methylbutane}$$

The maximum number of RBr producing 2-methylbutane by above sequence of reactions is _____. (Consider the structural isomers only)

Options

1. 1

2. 3

3. 5

4. 4

Question Type : **MCQ**
Question ID : **656445292**
Option 1 ID : **6564451003**
Option 2 ID : **6564451002**
Option 3 ID : **6564451000**
Option 4 ID : **6564451001**
Status : **Marked For Review**
Chosen Option : **4**

Q.58 Given below are two statements :

Statement (I) : A spectral line will be observed for a $2p_x \rightarrow 2p_y$ transition.

Statement (II) : $2p_x$ and $2p_y$ are degenerate orbitals.

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

Question Type : **MCQ**
Question ID : **656445276**
Option 1 ID : **656445936**
Option 2 ID : **656445939**
Option 3 ID : **656445938**
Option 4 ID : **656445937**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.59 The alkane from below having two secondary hydrogens is :

Options

1. 2,2,4,4-Tetramethylhexane
2. 2,2,3,3-Tetramethylpentane
3. 4-Ethyl-3,4-dimethyloctane
4. 2,2,4,5-Tetramethylheptane

Question Type : **MCQ**
Question ID : **656445291**
Option 1 ID : **656445997**
Option 2 ID : **656445998**
Option 3 ID : **656445996**
Option 4 ID : **656445999**
Status : **Answered**
Chosen Option : **2**

Q.60

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

List - I (Partial Derivatives)		**List - II (Thermodynamic Quantity)**
(A) $\left(\frac{\partial G}{\partial T}\right)_P$	(I)	C_P
(B) $\left(\frac{\partial H}{\partial T}\right)_P$	(II)	$-S$
(C) $\left(\frac{\partial G}{\partial P}\right)_T$	(III)	C_v
(D) $\left(\frac{\partial U}{\partial T}\right)_V$	(IV)	V

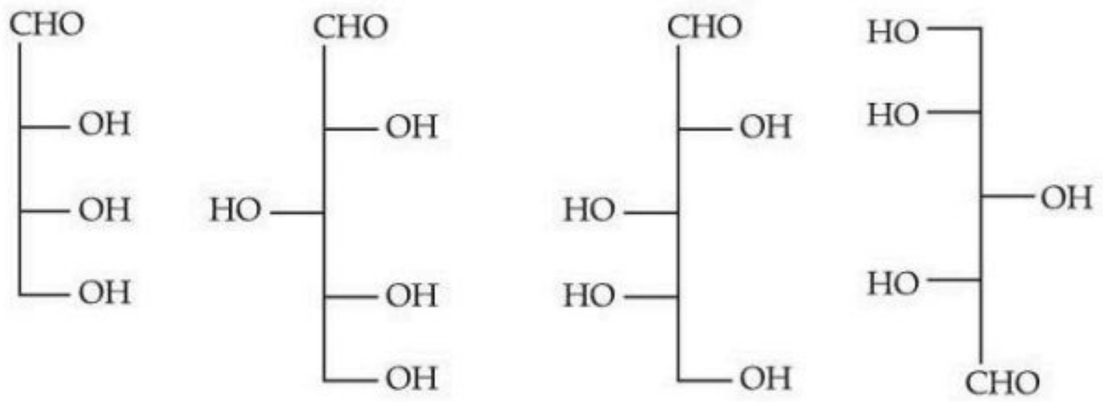
Choose the **correct** answer from the options given below :

Options

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

Question Type : **MCQ**
Question ID : **656445279**
Option 1 ID : **656445949**
Option 2 ID : **656445948**
Option 3 ID : **656445950**
Option 4 ID : **656445951**
Status : **Answered**
Chosen Option : **1**

Q.61 Identify the number of structure/s from the following which can be correlated to D-glyceraldehyde.



Options

1. four
2. three
3. two
4. one

Question Type : **MCQ**
Question ID : **656445295**
Option 1 ID : **6564451015**
Option 2 ID : **6564451014**
Option 3 ID : **6564451013**
Option 4 ID : **6564451012**
Status : **Marked For Review**
Chosen Option : **3**

Q.62 Arrange the following compounds in increasing order of their dipole moment :
HBr, H_2S, NF_3 and $CHCl_3$

Options

1. $CHCl_3 < NF_3 < HBr < H_2S$
2. $NF_3 < HBr < H_2S < CHCl_3$
3. $H_2S < HBr < NF_3 < CHCl_3$
4. $HBr < H_2S < NF_3 < CHCl_3$

Question Type : **MCQ**
Question ID : **656445283**
Option 1 ID : **656445966**
Option 2 ID : **656445964**
Option 3 ID : **656445965**
Option 4 ID : **656445967**
Status : **Marked For Review**
Chosen Option : **2**

Q.63 Given below are two statements :

Statement (I) : An element in the extreme left of the periodic table forms acidic oxides.

Statement (II) : Acid is formed during the reaction between water and oxide of a reactive element present in the extreme right of the periodic table.

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 : **656445284**
Option 1 ID : **656445969**
Option 2 ID : **656445970**
Option 3 ID : **656445971**
Option 4 ID : **656445968**
Status : **Answered**
Chosen Option : **3**

Q.64 Given below are two statements :

Statement (I) : Nitrogen, sulphur, halogen and phosphorus present in an organic compound are detected by Lassaigne's Test.

Statement (II) : The elements present in the compound are converted from covalent form into ionic form by fusing the compound with Magnesium in Lassaigne's test.

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 false but **Statement II** is true
4. **Statement I** is true but **Statement II** is false

Question Type : **MCQ**
Question ID : **656445288**
Option 1 ID : **656445985**
Option 2 ID : **656445984**
Option 3 ID : **656445987**
Option 4 ID : **656445986**
Status : **Not Attempted and Marked For Review**
Chosen Option : **--**

Q.65 The correct order of the following complexes in terms of their crystal field stabilization energies is :

Options 1.

$[Co(NH_3)_6]^{2+} < [Co(NH_3)_6]^{3+} < [Co(NH_3)_4]^{2+} < [Co(en)_3]^{3+}$

2.

$[Co(en)_3]^{3+} < [Co(NH_3)_6]^{3+} < [Co(NH_3)_6]^{2+} < [Co(NH_3)_4]^{2+}$

3.

$[Co(NH_3)_4]^{2+} < [Co(NH_3)_6]^{2+} < [Co(NH_3)_6]^{3+} < [Co(en)_3]^{3+}$

4.

$[Co(NH_3)_4]^{2+} < [Co(NH_3)_6]^{2+} < [Co(en)_3]^{3+} < [Co(NH_3)_6]^{3+}$

Question Type : **MCQ**
Question ID : **656445287**
Option 1 ID : **656445980**
Option 2 ID : **656445983**
Option 3 ID : **656445982**
Option 4 ID : **656445981**
Status : **Marked For Review**
Chosen Option : **3**

Q.66 Density of 3 M NaCl solution is 1.25 g/mL. The molality of the solution is :

Options 1. 2.79 m

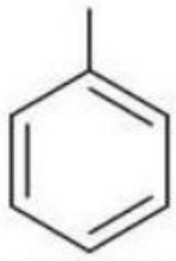
2. 1.79 m

3. 3 m

4. 2 m

Question Type : **MCQ**
Question ID : **656445280**
Option 1 ID : **656445953**
Option 2 ID : **656445955**
Option 3 ID : **656445952**
Option 4 ID : **656445954**
Status : **Answered**
Chosen Option : **1**

Q.67



Toluene
(excess)

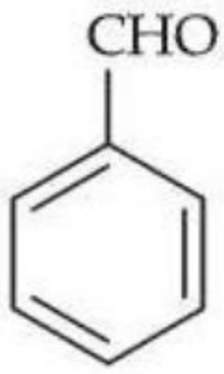
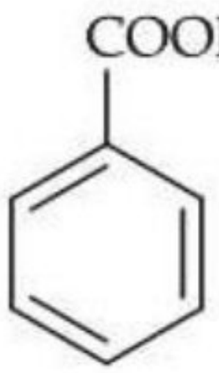
$$\xrightarrow[\text{(ii) } H_3O^+]{\text{(i) } CrO_2Cl_2,\ CS_2} \text{Filter} \longrightarrow \text{Residue (A)}$$
$$\text{(iii) } NaHSO_3$$

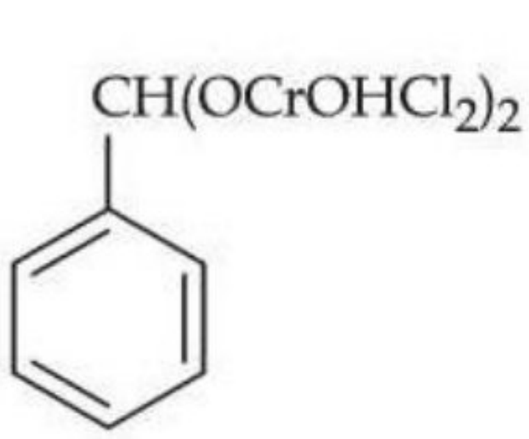
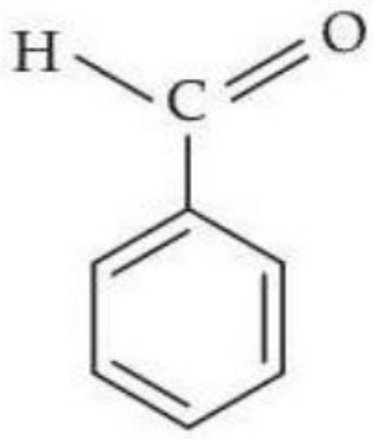
Residue (A) + HCl(dil) → Compound (B)

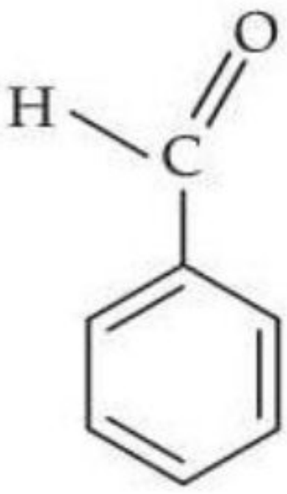
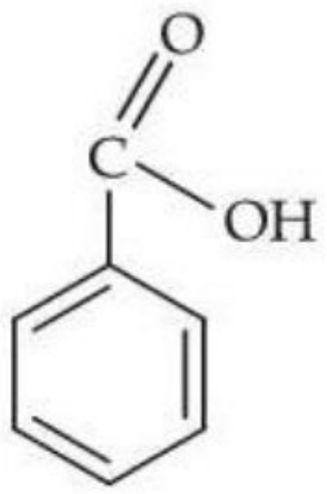
Structure of residue (A) and compound (B) formed respectively is :

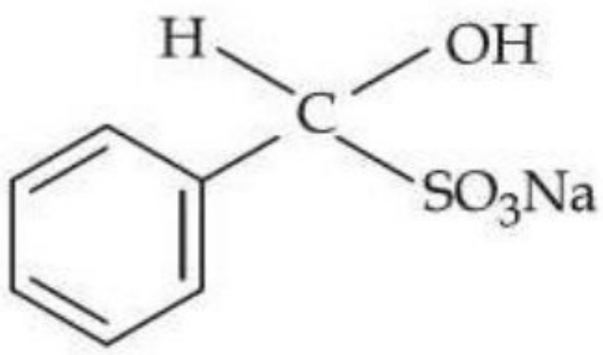
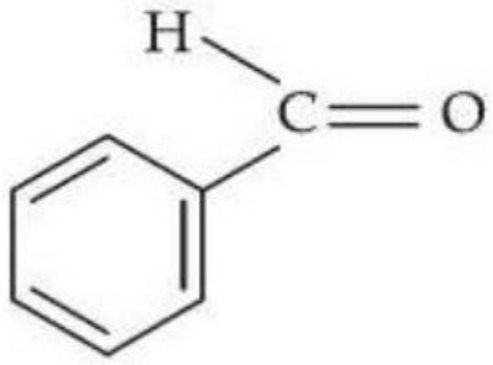
[A] [B]

Options

1.  

2.  

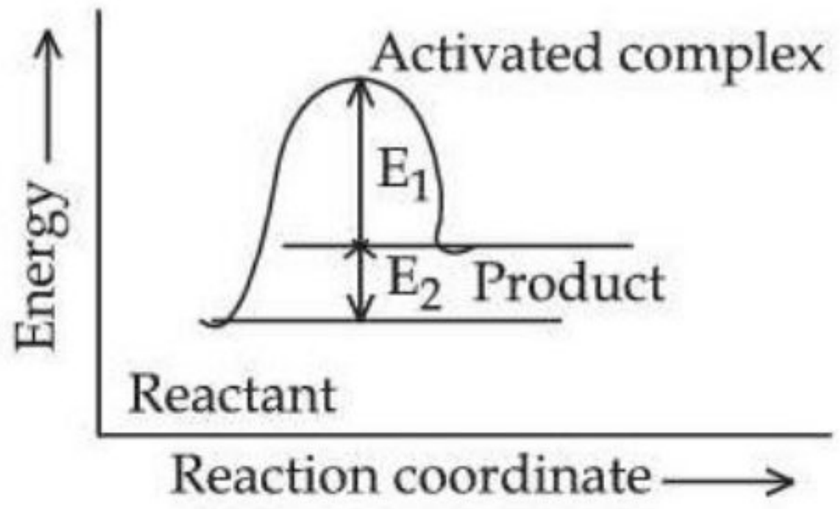
3.  

4.  

Question Type : **MCQ**
Question ID : **656445293**
Option 1 ID : **6564451006**
Option 2 ID : **6564451004**
Option 3 ID : **6564451005**
Option 4 ID : **6564451007**
Status : **Answered**
Chosen Option : **3**

Q.68

Consider the given figure and choose the **correct** option :



Options 1.

Activation energy of both forward and backward reaction is $E_1 + E_2$ and reactant is more stable than product.

2.

Activation energy of backward reaction is E_1 and product is more stable than reactant.

3.

Activation energy of forward reaction is $E_1 + E_2$ and product is less stable than reactant.

4.

Activation energy of forward reaction is $E_1 + E_2$ and product is more stable than reactant.

Question Type : **MCQ**
Question ID : **656445282**
Option 1 ID : **656445962**
Option 2 ID : **656445963**
Option 3 ID : **656445960**
Option 4 ID : **656445961**
Status : **Answered**
Chosen Option : **3**

Q.69

The species which does not undergo disproportionation reaction is :

Options 1. ClO_2^-

2. ClO_4^-

3. ClO_3^-

4. ClO^-

Question Type : **MCQ**
Question ID : **656445281**
Option 1 ID : **656445957**
Option 2 ID : **656445959**
Option 3 ID : **656445958**
Option 4 ID : **656445956**
Status : **Answered**
Chosen Option : **2**

Q.70 The maximum covalency of a non-metallic group 15 element 'E' with weakest E – E bond is :

Options

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

Question Type : **MCQ**
Question ID : **656445285**
Option 1 ID : **656445975**
Option 2 ID : **656445974**
Option 3 ID : **656445972**
Option 4 ID : **656445973**
Status : **Marked For Review**
Chosen Option : **4**

Section : **Chemistry Section B**

Q.71 Niobium (Nb) and ruthenium (Ru) have "x" and "y" number of electrons in their respective 4d orbitals. The value of $x+y$ is _____.

Given Answer : **11.00**

Question Type : **SA**
Question ID : **656445298**
Status : **Answered**

Q.72 The compound with molecular formula C_6H_6, which gives only one monobromo derivative and takes up four moles of hydrogen per mole for complete hydrogenation has _____ π electrons.

Given Answer : **8.00**

Question Type : **SA**
Question ID : **656445299**
Status : **Answered**

Q.73 Consider the following cases of standard enthalpy of reaction $\left(\Delta H_r^{\circ} \text{ in kJ mol}^{-1}\right)$

$$C_2H_6(g) + \frac{7}{2}O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l) \quad \Delta H_1^{\circ} = -1550$$

$$C(\text{graphite}) + O_2(g) \rightarrow CO_2(g) \quad \Delta H_2^{\circ} = -393.5$$

$$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l) \quad \Delta H_3^{\circ} = -286$$

The magnitude of $\Delta H_{f\,C_2H_6(g)}^{\circ}$ is _____ kJ mol^{-1} (Nearest integer).

Given Answer: **95.00**

Question Type : **SA**
Question ID : **656445297**
Status : **Answered**

Q.74 The complex of Ni^{2+} ion and dimethyl glyoxime contains _____number of Hydrogen (H) atoms.

Given Answer: **12.00**

Question Type : **SA**
Question ID : **656445300**
Status : **Marked For Review**

Q.75 20 mL of 2 M NaOH solution is added to 400 mL of 0.5 M NaOH solution. The final concentration of the solution is _____ $\times 10^{-2}$ M. (Nearest integer)

Given Answer: **57.00**

Question Type : **SA**
Question ID : **656445296**
Status : **Answered**