Question no. 1

Resistance of the wire is measured as 2Ω and 3Ω at 10°C and 30°C respectively. Temperature coefficient of resistance of the material of the wire is :

(1) $0.033°C^{-1}$ (2) $-0.033°C^{-1}$

(3) $0.011°C^{-1}$ (4) $0.055°C^{-1}$

$R_1 = R_0(1+\alpha t)$

$2 = R_0(1+\alpha \times 10)$ - ①

$3 = R_0(1+\alpha \times 30$ - ②

Divide

$\frac{2}{3} = \frac{R_0(1+10\alpha)}{R_0(1+30\alpha)}$

$2(1+30\alpha) = 3(1+10\alpha)$

$2+60\alpha = 3+30\alpha$

$60\alpha - 30\alpha = 3-2$

$30\alpha = 1$

$\alpha = \frac{1}{30}$

$\alpha = \frac{10}{3\times100}$

$\alpha = 0.033$

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Question no. 2

If n_1, n_2 and n_3 are the fundamental frequencies of three segments into which a string is divided, then the original fundamental frequency n of the string is given by

(1) $\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$

(2) $\frac{1}{\sqrt{n}} = \frac{1}{\sqrt{n_1}} + \frac{1}{\sqrt{n_2}} + \frac{1}{\sqrt{n_3}}$

(3) $\sqrt{n} = \sqrt{n_1} + \sqrt{n_2} + \sqrt{n_3}$

(4) $n = n_1 + n_2 + n_3$

$f = \frac{1}{2l}\sqrt{\frac{T}{\mu}}$

$f \propto \frac{1}{l}$

$n \propto \frac{1}{l}$

$l = l_1 + l_2 + l_3$

$\frac{1}{n} = \frac{1}{n_1} + \frac{1}{n_2} + \frac{1}{n_3}$

Question no. 3

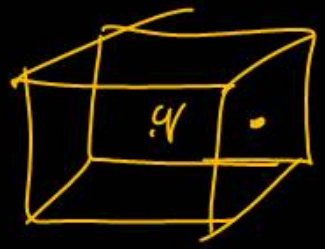
In a cuboid of dimension $2L \times 2L \times L$, a charge q is placed at the centre of the surface 'S' having area of $4L^2$. The flux through the opposite surface to 'S' is given by

(1) $\frac{q}{12\varepsilon_0}$

(2) $\frac{q}{3\varepsilon_0}$

(3) $\frac{q}{2\varepsilon_0}$

(4) $\frac{q}{6\varepsilon_0}$



$\frac{q}{\epsilon_0} = 6\phi$

$\phi = \frac{q}{6\epsilon_0}$

Question no. 4

In young's double–slit experiment, the intensity of light at a point on the screen where the path difference is λ is I, (λ being the wavelength of light used. The intensity at a point where the path difference is $\frac{\lambda}{4}$ will be

(1) $\frac{I}{4}$

(2) $\frac{I}{2}$

(3) I

(4) Zero

$I = I_0 \cos^2 \frac{\phi}{2}$

$\phi = \frac{2\pi}{\lambda} \cdot x$

$I = I_0 \cos^2 \frac{2\pi}{\lambda} x$

$I = I_0 \cos^2 \frac{\pi x}{\lambda}$

$I = I_0 \cos^2 \frac{\pi}{\lambda} \cdot x$

$I = I_0 \cos^2 \pi$

$I = I_0$ -①

$I' = I_0 \cos^2 \frac{\pi}{\lambda} \times \frac{\lambda}{4}$

$I' = I_0 \cos^2 \frac{\pi}{4}$

$I' = I_0$

$I' = \frac{I}{2}$

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Question no. 5

A proton and an alpha particle of the same velocity enter in a uniform magnetic field which is acting perpendicular to their direction of motion. The ratio of the radius for circular paths described by the alpha particle and proton is:

(1) 1 : 4 (2) 4 : 1

(3) 2 : 1 (4) 1 : 2

$$r = \frac{mv}{qB}$$

$$r_\alpha = \frac{4mv}{2qB}$$

$$r_\alpha = 2\left(\frac{mv}{qB}\right)$$

$$r_\alpha = 2r_p$$

$$\frac{r_\alpha}{r_p} = \frac{2}{1}$$

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Question no. 6

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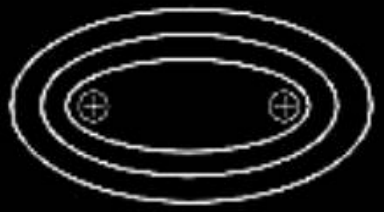
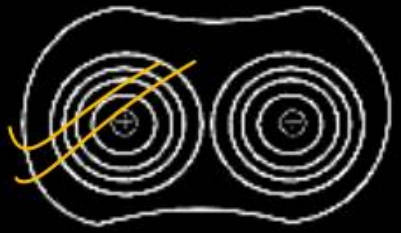
Which of the following figure shows the correct equipotential surfaces of a system of two positive charges?

(1) 

(2) 

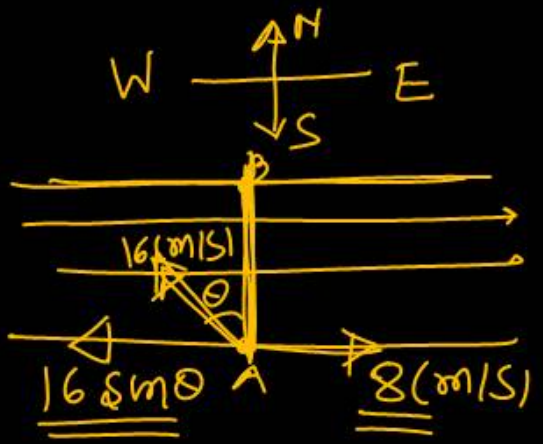
(3) 

(4) 

Question no. 7

The speed of a swimmer in still water is 16 m/s. The speed of river water is 8 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path. The angle at which he should make his strokes w.r.t. north is given by

(1) 60° west
(2) 45° west
(3) 30° west
(4) 0°



$16 \sin\theta = 8$

$\sin\theta = \frac{1}{2}$

$\theta = 30^\circ$

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Question no. 8

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Magnetic flux ϕ in weber in a closed circuit or resistance 10Ω varies with time ϕ (sec) as $\phi = 6t^2 - 5t + 1$. The magnitude of induced current at t = 0.25 s is

(1) 0.2 A (2) 0.6 A

(3) 1.2 A (4) 0.8 A

$\mathcal{E} = -\frac{d\phi}{dt}$

$\mathcal{E} = -\frac{d}{dt}(6t^2 - 5t + 1)$

$\mathcal{E} = -(12t - 5)$

$\mathcal{E} = -(12 \times 0.25 - 5)$

$\mathcal{E} = -(3 - 5)$

$\mathcal{E} = 2$ volt

$i = \frac{\mathcal{E}}{R}$

$i = \frac{2}{10}$

$i = 0.2$ A

$125 \times 25 = 300$

Question no. 9

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The ratio of magnetic field due to a smaller bar magnetic in the end on position to broad side on position is

(1) 1/4 (2) 1/2

(3) 1 (4) 2

$$B_{BOO} = \frac{\mu_0}{4\pi}\frac{M}{d^3}$$

$$B_{End} = \frac{\mu_0}{4\pi}\frac{2M}{d^3}$$

$$B_{End} = 2\left(\frac{\mu_0}{4\pi}\frac{M}{d^3}\right)$$

$$B_{End} = 2B_{Broad}$$

$$\frac{B_{End}}{B_{Broad}} = \frac{2}{1}$$

Question no. 10

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Determine the rms value of the emf given by

$E = 8 \sin(\omega t) + 6 \sin(2\omega t)$ (in volt)

(1) $5\sqrt{2}$V

(2) $7\sqrt{2}$V

(3) 10 V

(4) $10\sqrt{2}$V

$E_0 = \sqrt{8^2 + 6^2}$

$E_0 = 10$

$E_{RMS} = \frac{E_0}{\sqrt{2}}$

$= \frac{10}{\sqrt{2}} = 5\sqrt{2}$ Volt.

Question no. 11

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An alternating voltage $V = V_0 \sin \omega t$ is applied across a circuit. As a result, a current $I = I_0 \sin (\omega t - \pi/2)$ flows in it. The power consumed per cycle is

(1) zero

(2) $0.5\ V_0 I_0$

(3) $0.707\ V_0 I_0$

(4) $1.414\ V_0 I_0$

$P = V_{RMS} I_{RMS} \cos\phi$

$= V_{RMS} I_{RMS} \cos\frac{\pi}{2}$

$P = 0$

Question no. 12

The threshold frequency for a photosensitive metal is 3.3×10^{14} Hz. If light of frequency 8.2×10^{14} Hz is incident on the this metal, the cut–off voltage for the photoelectric emission is nearly

(1) 2V (2) 3V

(3) 5V (4) 1V

$h\upsilon = h\upsilon_0 + eV_{sp}$.

$h(\upsilon - \upsilon_0) = eV_{sp}$.

$\frac{h(\upsilon - \upsilon_0)}{e} = V_{sp}$.

$\frac{6.6\times10^{-34}}{1.6\times10^{-19}}(8.2\times10^{14} - 3.3\times10^{14}) = V_{sp}$

$V_{sp} = 2\text{ volt (Approx)}$

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Question no. 13

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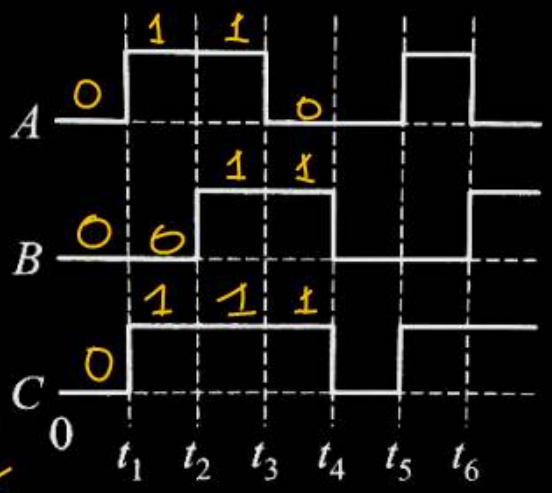
The figure shows a logic circuit with two inputs A and B and the output C. The voltage wave forms across A, B and C are as given. The logic gate circuit is



A+B= 1+0 = 1
C = 1

A = 0
B = 0
C = 0
A + B = C
0 + 0 = 0
0 = 0

A = 1
B = 0
C = 1
C = A + B
1 = 1 + 0
1 = 1

A = 1
B = 1
C = 1
C = A + B
1 = 1 + 1
1 = 1

A = 0
B = 1
C = 1
A + B = C
0 + 1 = 1
1 = 1

(1) OR gate
(2) NOR gate
(3) AND gate
(4) NAND gate

Question no. 14

The torque of a force $5\hat{i}+3\hat{j}-7\hat{k}$ about the origin is τ. If the force acts on a particle whose position vector is $2\hat{i}+2\hat{j}+\hat{k}$, the the value of τ will be :

(1) $11\hat{i}+19\hat{j}-4\hat{k}$ (2) $-11\hat{i}+9\hat{j}-16\hat{k}$

(3) $-17\hat{i}+19\hat{j}-4\hat{k}$ (4) $17\hat{i}+9\hat{j}+16\hat{k}$

$$\vec{\tau}=\vec{r}\times\vec{F}$$

$$=\begin{vmatrix}\hat{i} & \hat{j} & \hat{k}\\ 2 & 2 & 1\\ 5 & 3 & -7\end{vmatrix}$$

$$=\hat{i}\begin{vmatrix}2 & 1\\ 3 & -7\end{vmatrix}-\hat{j}\begin{vmatrix}2 & 1\\ 5 & -7\end{vmatrix}+\hat{k}\begin{vmatrix}2 & 2\\ 5 & 3\end{vmatrix}$$

$$=\hat{i}(-14-3)-\hat{j}(-14-5)+\hat{k}(6-10)$$

$$=-17\hat{i}+19\hat{j}-4\hat{k}\ (\text{Nm})$$

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Question no. 15

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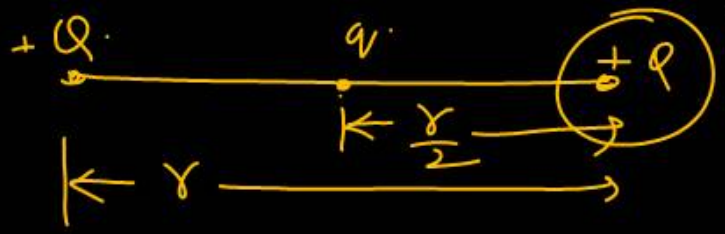
If a charge q is placed at the centre of the line joining two equal charges Q such that the system is in equilibrium the value of q is

(1) Q/2 (2) – Q/2

(3) Q/4 (4) – Q/4



$$\frac{kQ^2}{r^2} + \frac{kQ \cdot q}{\left(\frac{r}{2}\right)^2} = 0$$

$$\frac{kQ^2}{r^2} + \frac{4kQq}{r^2} = 0$$

$$Q + 4q = 0$$

$$4q = -Q \Rightarrow$$

$$q = \frac{-Q}{4}$$

Question no. 16

A coil of one turn is made of a wire of certain length and then from the same length a coil of two turns is made. If the same current is passed in both the cases, then the ratio of the magnetic inductions at their centres will be

(1) 2 : 1 (2) 1 : 4

(3) 4 : 1 (4) 1 : 2

$B = \frac{\mu_0 2\pi N i}{4\pi r}$

$\ell = 2\pi r N$

$2\pi r N = 2\pi$

$N \propto \frac{1}{r}$

$B \propto \frac{N \cdot i}{r} \Rightarrow B \propto N \cdot N^{r}$

$B \propto N^2$

B

$\frac{B_1}{B_2} = \left(\frac{N_1}{N_2}\right)^2$

$\frac{B_1}{B_2} = \left(\frac{1}{2}\right)^2$

$\frac{B_1}{B_2} = \frac{1}{4}$

Question no. 17

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A parallel plate air capacitor has a capacitance of 100 μF. The plates are at a distance d apart. If a slab of thickness t (t < d) and dielectric constant 5 is introduced between the parallel plates, then the capacitance will be

(1) 50 μF (2) 100 μF

(3) 200 μF (4) 500 μF

$C_{air} = 100\,\mu F$

$C_{med} = K C_{air}$

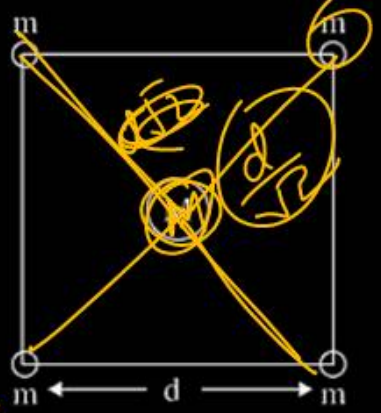
$= 5 \times 100$

$= 500\,\mu F$

$C = \frac{\varepsilon_0 A}{d - t + \frac{t}{K}}$

Question no. 18

Four spheres each of mass m form a square of side d (as shown in figure). A fifth sphere of mass M is situated at the centre of square. The total gravitational potential energy of the system is:



(1) $-\frac{Gm}{d}\left[\left(4+\sqrt{2}\right)m+4\sqrt{2}M\right]$

(2) $-\frac{Gm}{d}\left[\left(4+\sqrt{2}\right)M+4\sqrt{2}m\right]$

(3) $-\frac{Gm}{d}\left[3m^2+4\sqrt{2}M\right]$

(4) $-\frac{Gm}{d}\left[6m^2+4\sqrt{2}M\right]$

$$U = -\frac{Gm^2}{d}\times 4 + \left[-\frac{Gm^2}{d\sqrt{2}}\times 2\right] + 4\left[-\frac{GMm}{\frac{d}{\sqrt{2}}}\right]$$

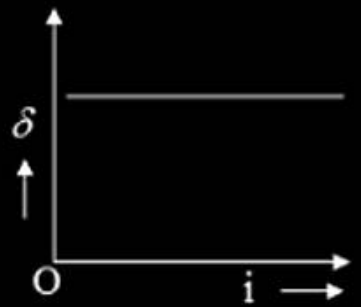
$$U = -\frac{Gm^2\times 4}{d} - \frac{Gm^2\sqrt{2}}{d} - \frac{4\sqrt{2}GMm}{d}$$

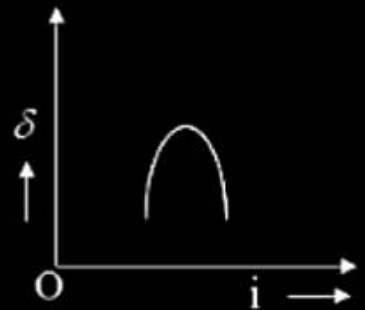
$$U = -\frac{Gm}{d}\left[4m+\sqrt{2}m+4\sqrt{2}M\right]$$

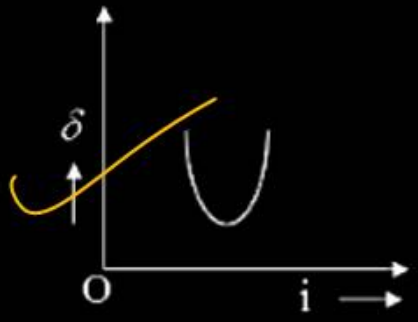
$$U = -\frac{Gm}{d}\left[\left(4+\sqrt{2}\right)m+4\sqrt{2}M\right]$$

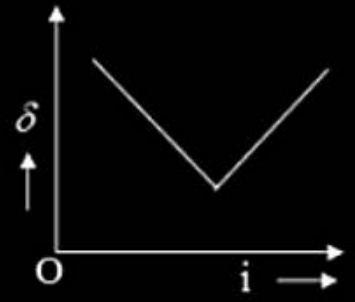
Question no. 19

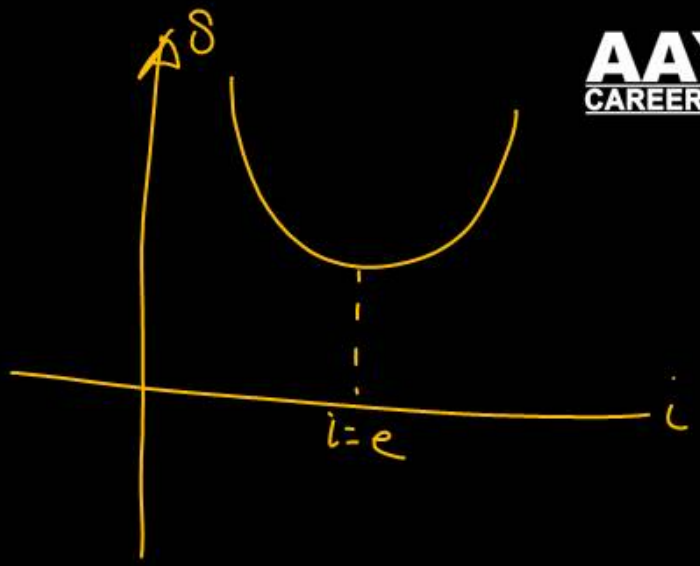
The graph between angle of deviation (δ) and angle of incidence (i) for a triangular prism is represented by

(1) 

(2) 

(3) 

(4) 



Question no. 20

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If the screw on a screw–gauge is given six rotations, it moves by 3 mm on the main scale. If there are 50 divisions on the circular scale the least count of the screw gauge is:

(1) 0.001 cm

(2) 0.02 mm

(3) 0.01 cm

(4) 0.001 mm

Distance — No of rotation.

3 — 6

P — 1

$6P = 3$

$P = 0.5\ mm$.

$LC = \frac{1}{100}\ cm$

$LC = \frac{P}{\text{No of divisions on circular scale}}$.

$LC = \frac{0.5\ mm}{500}$

$LC = \frac{1}{100}\ mm$

Question no. 21

AAYAM CAREER INSTITUTE

A gas has n degrees of freedom. The ratio of specific heat of gas at constant volume to the specific heat of gas at constant pressure will be:

(1) $\frac{n}{n+2}$ (2) $\frac{n+2}{n}$

(3) $\frac{n}{2n+2}$ (4) $\frac{n}{n-2}$

$C_V = \frac{fR}{2}$ n.

$C_V = \frac{nR}{2}$.

$C_p - C_V = R$.

$C_p = R + C_V$

$C_p = R + \frac{nR}{2}$.

$C_p = R\left[\frac{n+2}{2}\right]$

$\frac{C_V}{C_p} = \frac{\frac{nR}{2}}{R\left[\frac{n+2}{2}\right]}$

$= \frac{nR}{2} \times \frac{2}{R(n+2)}$

$= \frac{n}{n+2}$

Question no. 22

AAYAM CAREER INSTITUTE

The magnetic induction at a point P which is at a distance of 4 cm from a long current carrying wire is 10^{-3} T. The field of induction at a distance 12 cm from the current will be

(1) 3.33×10^{-4} T (2) 1.11×10^{-4} T

(3) 3×10^{-3} T (4) 9×10^{-3} T

$$B \propto \frac{1}{r}$$

$$\frac{B_2}{B_1} = \left(\frac{r_1}{r_2}\right)$$

$$\frac{B_2}{10^{-3}} = \left(\frac{4\,cm}{12\,cm}\right)$$

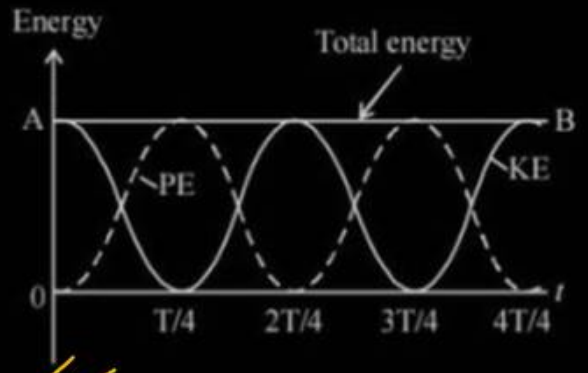
$$B_2 = \frac{1}{3} \times 10^{-3}$$

$$B_2 = \frac{10 \cdot 10^{-3}}{3 \times 10}$$

$$= 3.33 \times 10^{-4}\,(T)$$

Question no. 23

What do you conclude from the graph about the frequency of KE, PE and SHM?



(1) Frequency of KE and PE is double the frequency of SHM.

(2) Frequency of KE and PE is four times the frequency SHM.

(3) Frequency of PE is double the frequency of KE.

(4) Frequency of KE and PE is equal to the frequency of SHM.

$a\sin\omega t \Rightarrow V = a\omega\cos\omega t$

SHM ω 2ω 2ω

$P.E = \frac{1}{2} \cdot Kx^2$

$\omega \propto f$

$P.E = \frac{1}{2} \cdot k \cdot a^2\sin^2\omega t = \frac{ka^2}{4}[1-\cos 2\omega t]$

$K.E = \frac{1}{2} m \cdot a^2\omega^2\cos^2\omega t$

$= \frac{1}{4} ma^2\omega^2[1+\cos 2\omega t]$

$\omega \propto f$

$\cos 2\omega t = 1 - 2\sin^2\omega t$

$2\sin^2\omega t = 1 - \cos 2\omega t$

$\sin^2\omega t = \frac{1}{2}(1-\cos 2\omega t)$

$\cos 2\omega t = 2\cos^2\omega t - 1$

$1 + \cos 2\omega t = \cos^2\omega$

$\frac{1+\cos 2\omega t}{2}$

Question no. 24

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The mass of proton, neutron and helium nucleus are respectively 1.0073 u, 1.0087 u and 4.0015 u. The binding energy of helium nucleus is:

(1) 14.2 MeV (2) 56.8 MeV

(3) 28.4 MeV (4) 7.1 MeV

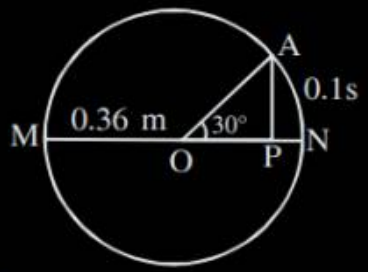
$$B.E = \Delta m \times 931 \text{ (MeV)}$$

$$= [2 \times 1.0073 + 2 \times 1.0087 - 4.0015] \times 931$$

$$B.E = 28.4 \text{ (MeV)}$$

Question no. 25

The point A moves with a uniform speed along the circumference of a circle of radius 0.36 m and covers 30^{o} in 0.1 s. The perpendicular projection 'P' from 'A' on the diameter MN represents the simple harmonic motion of 'P'. The restoration force per unit mass when P touches M will be



(1) 9.87 N/kg

(2) 50 N/kg

(3) 100 N/kg

(4) 0.49 N/kg

$$\frac{F}{m} = \omega^2 R$$

$$= \left(\frac{\Delta\theta}{\Delta t}\right)^2 \cdot R$$

$$= \left(\frac{\pi}{6 \times 0.1}\right)^2 \times 0.36$$

$$= \left(\frac{5}{3}\pi\right)^2 \times 0.36$$

$$= \frac{25 \times \pi^2 \times 0.36}{9}$$

$$= 25 \times 0.04 \times \pi^2$$

$$= 1 \times 9.87$$

$$= 9.87 \text{ N/kg}$$

Question no. 26

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The ratio of the energies of the hydrogen atom in its first to second excited states is

(1) 1/4 (2) 4/9

(3) 9/4 (4) 4

$$E = -\frac{13.6}{n^2}$$

$$\frac{E_1}{E_2} = \left(\frac{n_2}{n_1}\right)^2$$

$$= \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

Question no. 27

AAYAM CAREER INSTITUTE

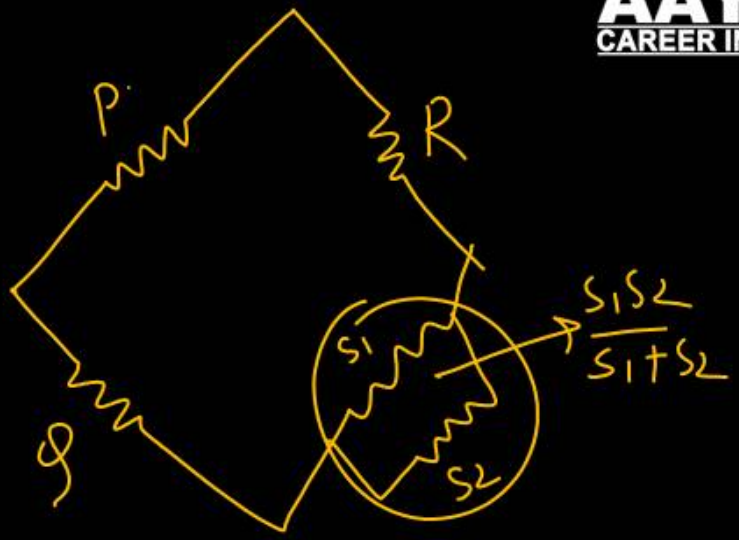
In a Wheatstone's bridge, three resistances P, Q and R connected in the three arms and the fourth arm is formed by two resistances S_1 and S_2 connected in parallel. The condition for the bridge to be balanced will be

(1) $\frac{P}{Q} = \frac{2R}{S_1 + S_2}$

(2) $\frac{P}{Q} = \frac{R(S_1 + S_2)}{S_1 S_2}$

(3) $\frac{P}{Q} = \frac{R(S_1 + S_2)}{2S_1 S_2}$

(4) $\frac{P}{Q} = \frac{R}{S_1 + S_2}$



$$\frac{P}{Q} = \frac{R}{\frac{S_1 S_2}{S_1 + S_2}}$$

$$\frac{P}{Q} = \frac{R(S_1 + S_2)}{S_1 S_2}$$

Question no. 28

A particle of mass m moves on a straight line with its velocity increasing with distance according to the equation $v = \alpha\sqrt{x}$, where α is a constant. The total work done by all the forces applied on the particle during its displacement from x = 0 to x = d, will be:

(1) $\frac{m}{2\alpha^2 d}$

(2) $\frac{md}{2\alpha^2}$

(3) $\frac{m\alpha^2 d}{2}$

(4) $2m\alpha^2 d$

$V = \alpha\sqrt{x}$

$V^2 = \alpha^2 x$

$V_i = 0$

$V_f^2 = \alpha^2 d$

$W = K_f - K_i$

$W = \frac{1}{2}m[V_f^2 - V_i^2]$

$W = \frac{1}{2}m\alpha^2 d$

$W = \frac{1}{2}m\alpha^2 d$

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Question no. 29

A pendulum is executing simple harmonic motion and its maximum kinetic energy is K_1. If the length of the pendulum is doubled and it performs simple harmonic motion with the same amplitude as in the first case, its maximum kinetic energy is K_2.

(1) $K_2 = 2K_1$

(2) $K_2 = \frac{K_1}{2}$

(3) $K_2 = \frac{K_1}{4}$

(4) $K_2 = K_1$

$K = \frac{1}{2} \cdot m \cdot \omega^2 \cdot a^2$

$= \frac{1}{2} \cdot m \cdot \left(\sqrt{\frac{g}{\ell}}\right)^2 \cdot (\ell \cdot \theta)^2$

$= \frac{1}{2} \cdot m \cdot \frac{g}{\ell} \cdot \ell^2 \cdot \theta^2$

$K \propto \ell$

$\frac{K_1}{K_2} = \frac{\ell_1}{\ell_2}$

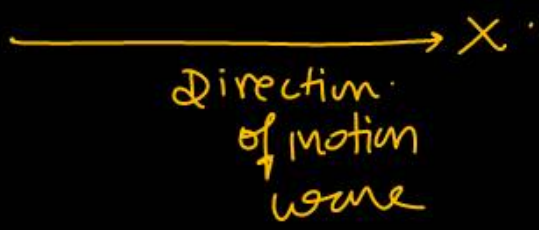
$\frac{K_1}{K_2} = \frac{\ell}{2\ell}$

$K_2 = 2K_1$

Question no. 30

AAYAM CAREER INSTITUTE

A plane electromagnetic wave propagates along the + x direction in free space. The components of the electric field, $\vec{E}$ and magnetic field, $\vec{B}$ vectors associated with the wave in Cartesian frame are:



(1) E_y, B_x

(2) E_y, B_z

(3) E_x, B_y

(4) E_z, B_y

Question no. 31

AAYAM CAREER INSTITUTE

A player stops a football weighing 0.5 kg which comes flying towards him with a velocity of 10 m/s. If the impact lasts for 1/50th sec. and the ball bounces back with a velocity of 15 m/s, then the average force involved is

(1) 250 N
(2) 1250 N
(3) 500 N
(4) 625 N

$$F = \frac{m[V+u]}{t}$$

$$F = \frac{0.5[10+15]}{\frac{1}{50}}$$

$$F = 25 \times 25$$

$$F = 625 \text{ N}$$

Question no. 32

AAYAM CAREER INSTITUTE

The number of free electrons per 100 mm of ordinary copper wire is 2×10^{21}. Average drift speed of electrons is 0.25 mm/s. The current flowing is

(1) 5A (2) 80A

(3) 8A (4) 0.8A

$$i = \frac{ne}{t}$$

$$i = \frac{nev}{\ell}$$

$$i = \frac{2 \times 10^{21} \times 1.6 \times 10^{-19} \times 0.25}{100}$$

$$i = 0.8\,A$$

$$V = \frac{\ell}{t}$$

$$\frac{V}{\ell} = \frac{1}{t}$$

Question no. 33

Projectiles A and B are thrown at angles of 45° and 60° with vertical respectively from top of a 400 m high tower. If their ranges and times of flight are same, the ratio of their speeds of projection $v_A : v_B$ is:

(1) $1:\sqrt{3}$

(2) $\sqrt{2}:1$

(3) $1:2$

(4) $1:\sqrt{2}$

$R = u\cos\theta\,(T)$

$u_A \cos\theta_A = u_B \cos\theta_B$

$V_A \cos 45^\circ = V_B \cos 60$

$$\frac{V_A}{V_B} = \frac{\cos 60}{\cos 45^\circ}$$

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

$$= \frac{1}{2} \times \frac{\sqrt{2}}{1}$$

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

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Question no. 34

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Relative permittivity and permeability of a material are ε_r and μ_r, respectively. Which of the following values of these quantities are allowed for a diamagnetic material?

(1) $\varepsilon_r = 1.5, \mu_r = 0.5$ (2) $\varepsilon_r = 0.5, \mu_r = 0.5$

(3) $\varepsilon_r = 1.5, \mu_r = 1.5$ (4) $\varepsilon_r = 0.5, \mu_r = 1.5$

Question no. 35

For a series RLC circuit $R = X_L = 2X_C$. The impedance of the circuit and phase difference between V and I respectively will be.

(1) $\frac{\sqrt{5}R}{2}, \tan^{-1}(2)$ (2) $\frac{\sqrt{5}R}{2}, \tan^{-1}(1/2)$

(3) $\sqrt{5}X_C, \tan^{-1}(2)$ (4) $\sqrt{5}R, \tan^{-1}(1/2)$

$Z = \sqrt{R^2 + (X_L - X_C)^2}$

$Z = \sqrt{R^2 + (2X_C - X_C)^2}$

$= \sqrt{R^2 + X_C^2}$

$= \sqrt{R^2 + \frac{R^2}{4}}$

$= \sqrt{\frac{5R^2}{4}}$

$Z = \frac{\sqrt{5}R}{2}$

$\tan\phi = \frac{X_L - X_C}{R}$

$= \frac{2X_C - X_C}{R}$

$= \frac{X_C}{R} = \frac{1}{2} \Rightarrow \phi = \tan^{-1}\left(\frac{1}{2}\right)$

$X_C = \frac{R}{2}$

$\frac{X_C}{R} = \frac{1}{2}$

Question no. 36

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The focal length of the objective and the eyepiece of telescope are 50 cm and 5 cm respectively. If the telescope is focussed for distinct vision on a scale distant 2 m from its objective, then its magnifying power will be:

(1) –4 (2) –8

(3) +8 (4) –2

$$\frac{1}{v_0} - \frac{1}{u_0} = \frac{1}{f_0}$$

$$\frac{1}{v_0} + \frac{1}{200} = \frac{1}{50}$$

$$\frac{1}{v_0} = \frac{1}{50} - \frac{1}{200} = \frac{4-1}{200} = \frac{3}{200}$$

$$v_0 = \frac{200}{3}$$

$$M = -\frac{v_0}{u_0}\left[1 + \frac{D}{f_e}\right]$$

$$M = -\frac{\frac{200}{3}}{\frac{200}{1}}\left[1 + \frac{25}{5}\right]$$

$$M = -\frac{200}{3} \times \frac{1}{200}\left[1+5\right]$$

$$M = -\frac{6}{3}$$

$$M = -2$$

Question no. 37

The radii of two planets 'A' and 'B' are 'R' and '4R' and their densities are ρ and $\rho/3$ respectively. The ratio of acceleration due to gravity at their surfaces ($g_A : g_B$) will be:

(1) 1 : 16 (2) 3 : 16

(3) 3 : 4 (4) 4 : 3

$$\rho = \frac{M}{V}$$

$$M = \rho \times V$$

$$M = \rho \times \frac{4}{3}\pi R^3$$

$$g = \frac{GM}{R^2}$$

$$g = \frac{G}{R^2} \times \frac{4}{3}\pi R^3 \times \rho$$

$$g = \frac{4}{3}\pi G \rho R$$

$$g \propto \rho R$$

$$\frac{g_A}{g_B} = \frac{\rho R}{\frac{\rho}{3} \times 4R}$$

$$= \frac{3}{4}$$

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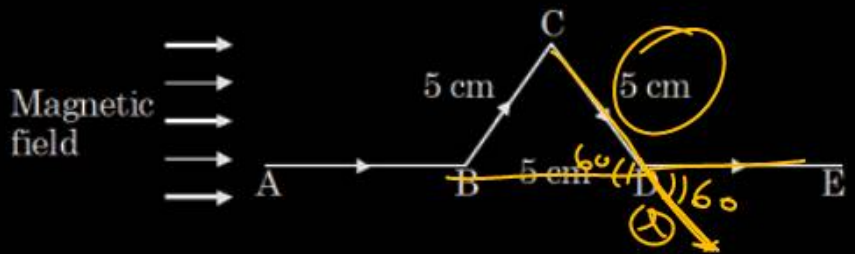
Question no. 38

A triangular shaped wire carrying 10 A current is placed in a uniform magnetic field of 0.5 T, as shown in figure. The magnetic force on segment CD is.
(Given BC = CD = BD = 5 cm)



(1) 0.126 N
(2) 0.312 N
(3) 0.216 N
(4) 0.245 N

$F = BIl\sin\theta$

$= 0.5 \times 10 \times 5 \times 10^{-2} \sin 60$

$= \frac{0.5 \times 10 \times 5 \times 10^{-2} \times \sqrt{3}}{2}$

$= 0.216\ N$

Question no. 39

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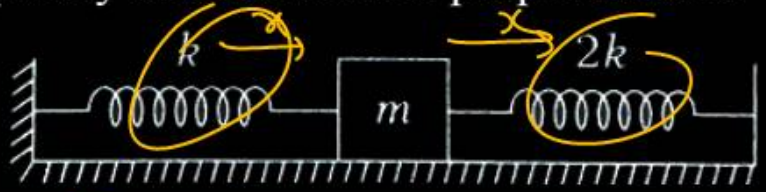
Frequency of oscillation is proportional to



(1) $\sqrt{\frac{3k}{m}}$

(2) $\sqrt{\frac{k}{m}}$

(3) $\sqrt{\frac{2k}{m}}$

(4) $\sqrt{\frac{m}{3k}}$

$T = 2\pi\sqrt{\frac{m}{K}}$.

$f = \frac{1}{T}$.

$f = \frac{1}{2\pi}\sqrt{\frac{K_{eq}}{m}}$.

$f = \frac{1}{2\pi}\sqrt{\frac{3K}{m}}$

$\omega = 2\pi f$.

$\omega = \sqrt{\frac{3K}{m}}$

Question no. 40

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The average kinetic energy per molecule of any ideal gas is always equal to

(1) $\frac{2}{3}k_BT$

(2) $\frac{3}{4}k_BT$

(3) $\frac{3}{2}k_BT$

(4) $3k_BT$

$E = \frac{3}{2}k_BT$

Question no. 41

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A body of mass m is accelerated uniformly from rest to a speed v in a time T. The instantaneous power delivered to the body as a function of time is given by

(1) $\frac{mv^2}{T^2}.t^2$

(2) $\frac{mv^2}{T^2}.t$

(3) $\frac{1}{2}\frac{mv^2}{T^2}.t^2$

(4) $\frac{1}{2}\frac{mv^2}{T^2}.t$

$P = F \cdot V$

$P = m \cdot a \cdot V$

$P = m \cdot a \cdot at$

$P = ma^2 t$

$P = m\left(\frac{V}{T}\right)^2 \cdot t$

$P = \frac{mV^2}{T^2} \cdot t$

Question no. 42

A steel rod of length 1 m and cross–sectional area 10^{-4} $m^2$is heated from 0°C to 200°C without being allowed to extend or bend. The compressive tension produced in the rod is. (Given Young's modulus of steel $= 2 \times 10^{11}$ Nm^{-2}, coefficient of linear expansion = 10^{-5} K^{-1}.)

(1) 2×10^4 N

(2) 4×10^4 N

(3) 6×10^4 N

(4) 8×10^4 N

$F = YA\alpha \cdot \Delta T$

$= 2 \times 10^{11} \times 10^{-4} \times 10^{-5} \times (200 - 0)$

$= 2 \times 10^{2} \times 200$

$= 4 \times 10^4$ (N).

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Question no. 43

Two strings A and B, made of same material, are stretched by same tension. The radius of strings A is double of radius of B. A transverse wave travels on A with speed V_A and on B with speed V_B. The ratio V_A/V_B is

(1) 1/2 (2) 2

(3) 1/4 (4) 4

$$V = \sqrt{\frac{T}{\mu}}$$

$$V = \sqrt{\frac{T}{\pi r^2 \times \rho}}$$

$$V \propto \frac{1}{r}$$

$$\frac{V_A}{V_B} = \frac{r_B}{r_A}$$

$$= \frac{r}{2r}$$

$$= \frac{1}{2}$$

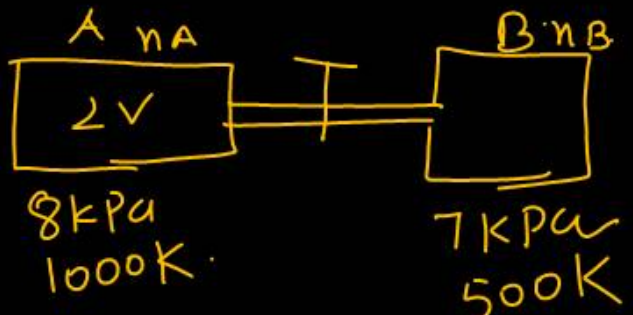
Question no. 44

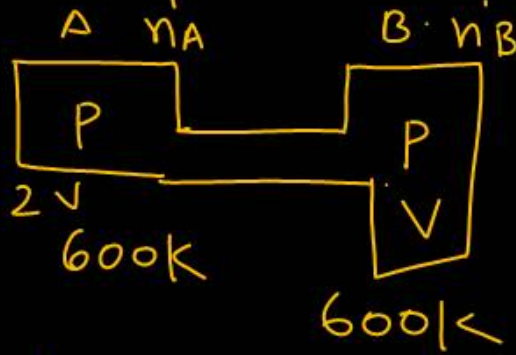
AAYAM CAREER INSTITUTE

There are two vessels filled with an ideal gas where volume of one is double the volume of other. The large vessel contains the gas at 8kPa at 1000 K while the smaller vessel contains the gas at 7 kPa at 500K. If the vessels are connected to each other by a thin tube allowing the gas to flow and the temperature of both vessels is maintained at 600 K, at steady state the pressure in the vessels will at 600 K, at steady the pressure in the vessels will be (in kPa).

(1) 4.4 (2) 6

(3) 24 (4) 18





$PV = nRT$

$n = \frac{PV}{RT}$

$n_A + n_B = n'_A + n'_B$

$\frac{8 \times 2V}{R \times 1000} + \frac{7 \times V \times 2}{2R \times 500} = \frac{2PV}{600R} + \frac{PV}{600R}$

$\frac{16}{1000} + \frac{14}{1000} = \frac{3P}{600} \Rightarrow P = 6\,kPa$

$\frac{30}{1000} = \frac{3}{600}$

Question no. 45

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Needles N_1, N_2 and N_3 are made of a ferromagnetic, a paramagnetic and a diamagnetic substance respectively. A magnet when brought close to them will

(1) attract N_1 and N_2 strongly but repel N_3

(2) attract N_1 strongly, N_2 weakly and repel N_3 weakly

(3) attract N_1 strongly, but repel N_2 and N_3 weakly

(4) attract all three of them

Question no. 46

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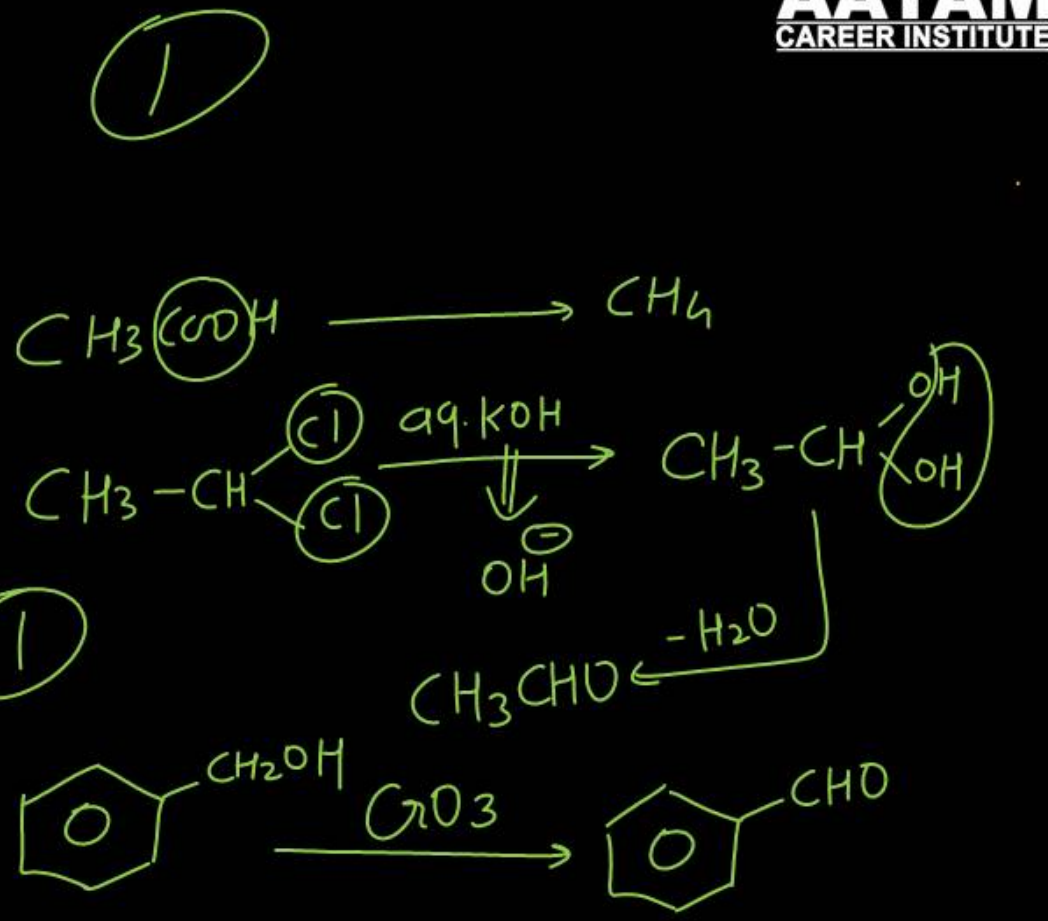
Match List – I with List – II.

	List – I (Change)		List – II (Reagent)
A.	Ethanoic acid into methane	i.	Aq. KOH
B.	1, 1-Dichloroethane into ethanol	ii	CrO_3
C.	Benzyl alcohol into benzaldehyde	iii.	$LiAlH_4$
D.	Benzoic acid to benzyl alcohol	iv.	NaOH/CaO

(1) A-iv, B-i, C-ii, D-iii (2) A-ii, B-iii, C-iv, D-i

(3) A-ii, B-iv, C-iii, D-i (4) A-iv, B-ii, C-i, D-iii



Question no. 47

The average oxidation state of Fe in Fe_3O_4 is

(1) +3

(2) 8/3

(3) +6

(4) +2

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O.S. of O = −2

Let O.S. of Fe = x

$3 \times x + 4(-2) = 0$

$3x - 8 = 0$

$3x = 8$

$x = 8/3$

Question no. 48

The equation $k = (6.5 \times 10^{12}\ s^{-1})\ e^{-26000K/T}$ is followed for the decomposition of compound A. The activation energy for the reaction is – (in kJ mol^{-1})

(1) 216 (2) 6.5×10^{2}

(3) 200 (4) 260

$$k = A\ e^{-Ea/RT}$$

$$k = (6.5\times10^{12})\ e^{-26000K/T}$$

$$+\frac{Ea}{R} = +26000$$

$$Ea = 26000 \times 8.314\ J$$

$$= 26 \times 8.314\ kJ$$

$$= 216$$

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Question no. 49

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Match List – I with List – II.

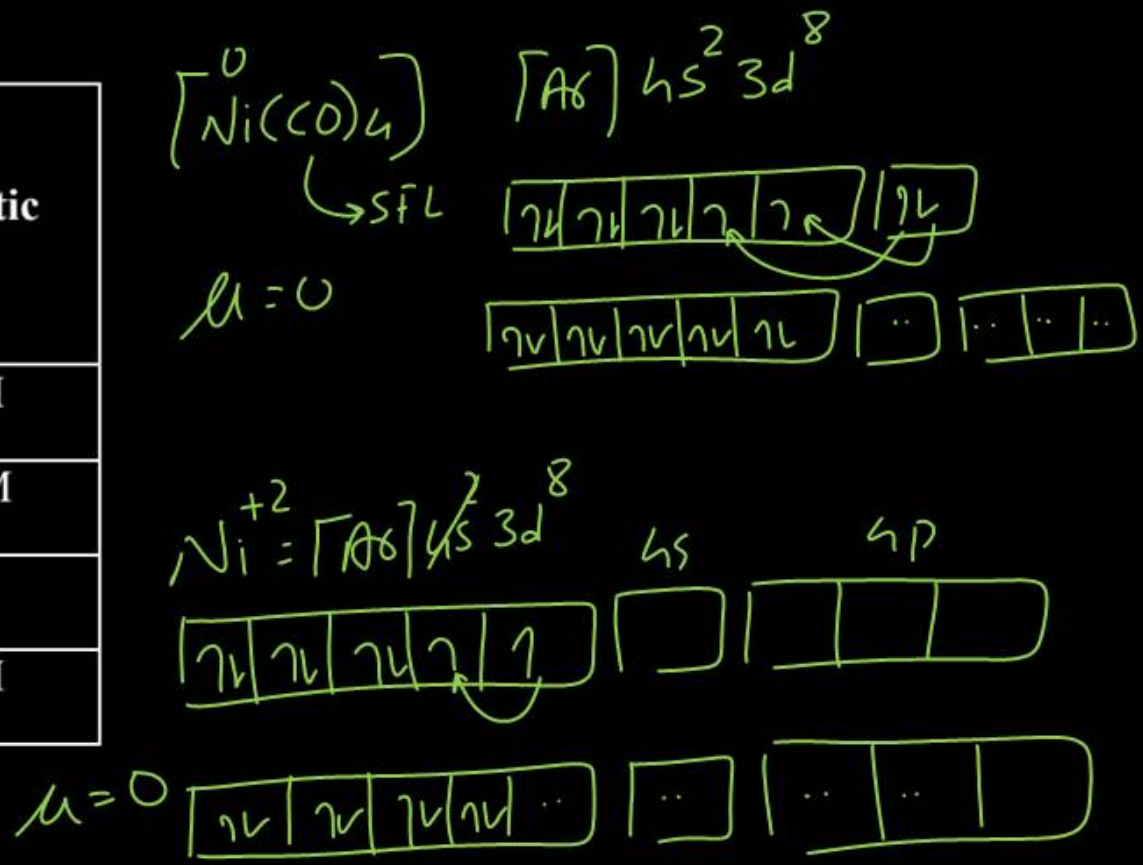
	List – I (Complex /Species)		List – II (Shape & magnetic moment)
A.	$[Ni(CO)_4]$	i.	Tetrahedral, 2.8 BM
B.	$[Ni(CN)_4]^{2-}$	ii	Square planar, 0 BM
C.	$[NiCl_4]^{2-}$	iii.	Tetrahedral, 0 BM
D.	$[MnBr_4]^{2-}$	iv.	Tetrahedral, 5.9 BM

(1) A-iii, B-iv, C-ii, D-i

(2) A-i, B-ii, C-iii, D-iv

(3) A-iii, B-ii, C-i, D-iv

(4) A-iv, B-i, C-iii, D-ii



Question no. 50

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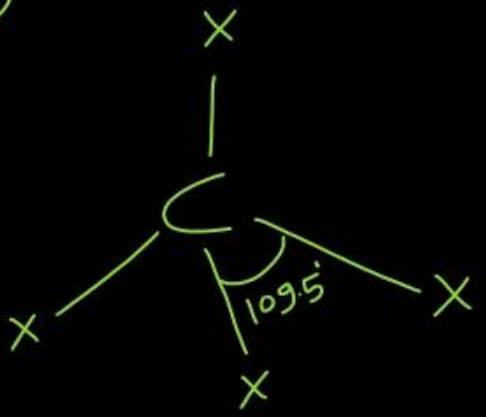
Which of the following statement are correct regarding hybridization?

A. sp^3- hybridization leads to a tetrahedral geometry with bond angle of approximately 109.5°.

B. sp^2- hybridization results in a trigonal pyramidal shape.

C. The percentage of s-character in sp-hybrid orbitals in 50%.

D. The bond angle in sp-hybridised molecules in 180°.



(1) A, B and C (2) A, Cand D

(3) A and B only (4) B and D only

Question no. 51

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$n_1 = 2, n_2 = 3, \ldots$

Assertion : For Balmer series of hydrogen spectrum, the value $n_1 = 2$ and $n_2 = 3, 4, 5$.

Reason : The value of n_1 and n_2 for a line in Balmer series of hydrogen spectrum having the highest wavelength is 4 and 6.

(1) If both Assertion and Reason are true and the Reason is a correct explanation of the Assertion.

(2) If both Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

(3) If the Assertion is true but Reason is false.

(4) If the Assertion is false but Reason is true.

Question no. 52

AAYAM CAREER INSTITUTE

Which of the following has the maximum magnetic moment?

(1) Mn^{2+} (2) Fe^{2+}

(3) Ti^{2+} (4) Cr^{2+}

1

$\mu \propto$ no. of unpaired e^-

$\mu = \sqrt{n(n+2)}$

$Mn^{+2} = [Ar]_{18} 4s^2 3d^5 = 3d^5$ ↑ ↑ ↑ ↑ ↑ $n=5$

$Fe^{+2} = [Ar] 4s^2 3d^6 = 3d^6$ ↑↓ ↑ ↑ ↑ ↑ $n=4$

$Ti^{+2} = [Ar] 4s^2 3d^2 = 3d^2$ ↑ ↑ | | | $n=2$

$Cr^{+2} = [Ar] 4s^1 3d^4 = 3d^4$ ↑ ↑ ↑ ↑ | $n=4$

Question no. 53

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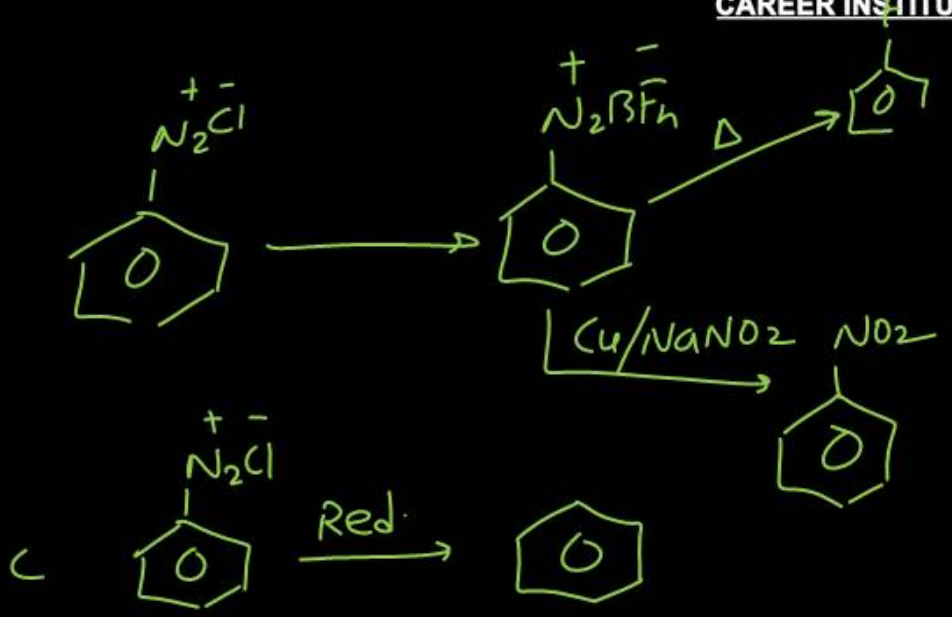
Match List – I with List – II.

	List – I (Change)		List – II (Reagent)
A.	$ArN_2^+Cl^- \rightarrow ArOH$	i.	$HBF_4 / NaNO_2$
B.	$ArN_2^+Cl^- \rightarrow ArNO_2$	ii	H_2O
C.	$ArN_2^+Cl^- \rightarrow ArH$	iii.	HBF_4
D.	$ArN_2^+Cl^- \rightarrow ArF$	iv.	CH_3CH_2OH

(1) A-ii, B-i, C-iv, D-iii (2) ~~A-iv, B-i, C-ii, D-iii~~

(3) ~~A-ii, B-iv, C-i, D-iii~~ (4) ~~A-ii, B-iv, C-iii, D-i~~

(1)



Question no. 54

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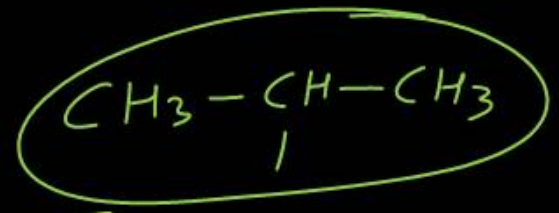
The compound which has one isopropyl group is

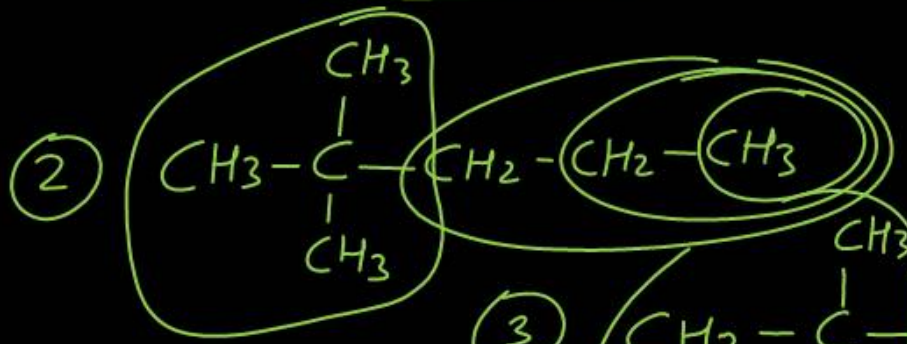
(1) 2, 2, 3, 3-Tetramethylpentane

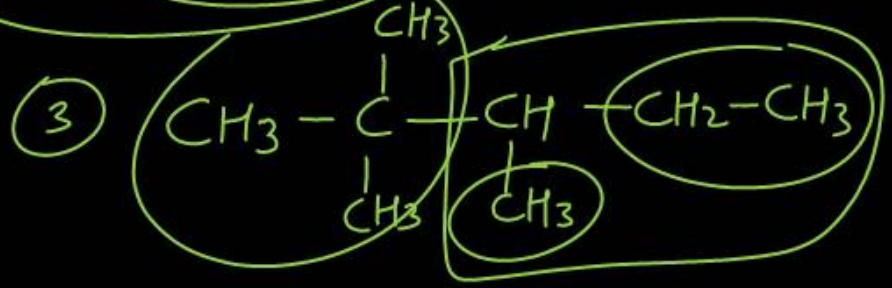
(2) 2, 2-Dimethylpentane

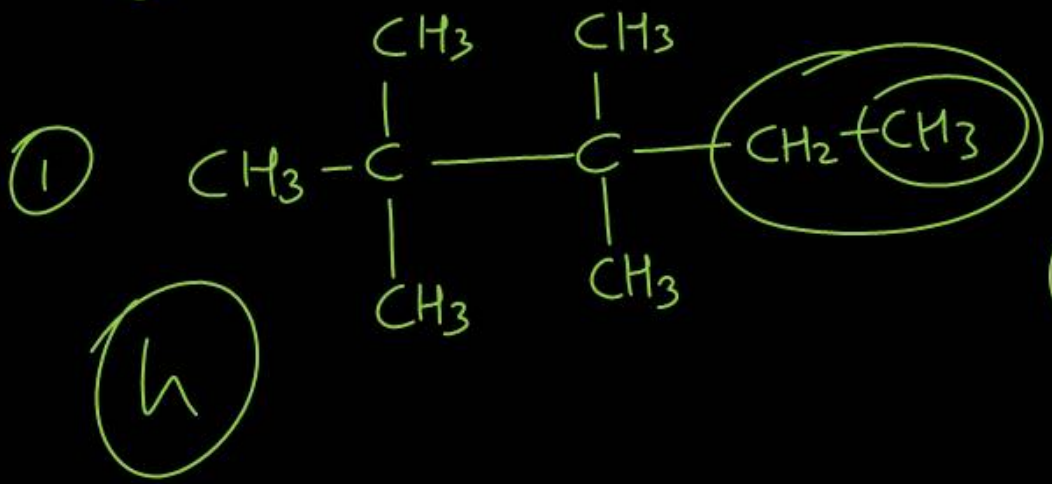
(3) 2, 2, 3-Trimethylpentane

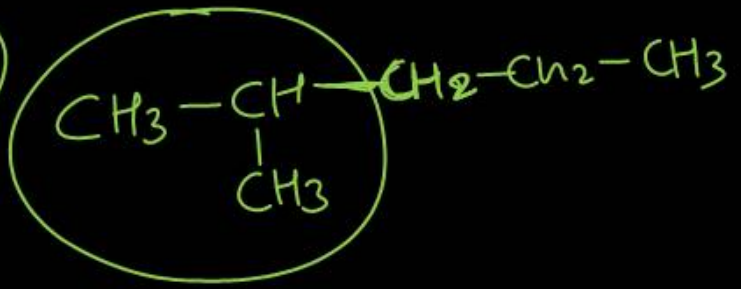
(4) 2-Methylpentane











Question no. 55

Which of the following complex shows sp^3d^2 hybridization?

(1) $[Cr(NO_2)_6]^{3-}$ (2) $[Fe(CN)_6]^{4-}$

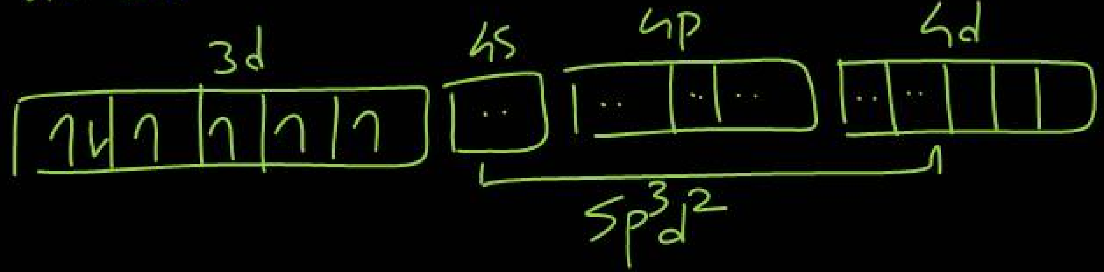
(3) $[CoF_6]^{3-}$ ~~(4) $[Ni(CO)_4]$~~

C.N. = 6 / SFL → d^2sp^3

WFL

(3)

$[Co(F_6)]^{-3} = Co^{+3} = [Ar]_{18}\ 4s^2\ 3d^{7 \to 6}$



Question no. 56

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Which of the following does not form a chelate?

(1) EDTA

(2) Oxalate

(3) Pyridine

(4) Ethylenediamine

Question no. 57

AAYAM CAREER INSTITUTE

Which one of following molecules is expected to exhibit diamagnetic behavior?

(1) C_2 (2) N_2^+

(3) O_2 (4) S_2

No. of e^- : even no. / Except 10 & 16 e^-

$C_2 = 12e^-$ / diamagnetic

$N_2^+ = 13e^-$ / paramagnetic

$O_2 = 16e^-$ / Paramagnetic

$S_2 = 32e^-$ / Paramagnetic

Question no. 58

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Match List – I with List – II.

	List – I (Order)		List – II (Properties)
A.	$Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$	i.	Ionisation Enthalpy
B.	B < C < O < N	ii	Metallic character
C.	B < Al < Mg < K	iii.	Electronegativity
D.	Si < P < S < Cl	iv.	Ionic radii

(1) A-iv, B-i, C-iii, D-ii (2) A-ii, B-iii, C-iv, D-i

(3) A-iv, B-i, C-ii, D-iii (4) A-iii, B-iv, C-ii, D-i

3

Question no. 59

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Match List – I with List – II.

	List – I (Vitamin)		List – II (Deficiency)
A.	Vitamin A	i.	Scurvy
B.	Vitamin B_{12}	ii	Hemorrhagic condition
C.	Vitamin C	iii.	Sterility
D.	Vitamin E	iv.	Xerophthalmia

Skin Dry | Eye Dry

(1) A-ii, B-iv, C-i, D-iii (2) A-iv, B-iii, C-i, D-ii

(3) A-iv, B-ii, C-i, D-iii (4) A-ii, B-iv, C-i, D-iii

3

Question no. 60

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Match List – I with List – II.

	List – I (Rules)		List – II (Statements)
A.	Hund's Rule	i.	No two electrons in an atom can have the same set of four quantum number
B.	Aufbau Principle	ii	In the ground state of atoms, orbitals are filled in the order of their increasing energies.
C.	Pauli Exculsion Principle	iii.	Pairing of electrons in the orbitals belonging to the same subshell does not take place until each orbital is singly occupied.
D.	Heisenberg's Uncertainty Principle	iv.	It is impossible to determine the exact position and exact momentum of a subatomic particle simultaneously.

(1) A-iii, B-i, C-ii, D-iv (2) A-iii, B-ii, C-iv, D-i

(3) A-iii, B-ii, C-i, D-iv (4) A-ii, B-iii, C-i, D-iv

A - iii

B - ii

C - i

D - iv

3

Question no. 61

AAYAM CAREER INSTITUTE

$K_3[Al(C_2O_4)_3]$ is Called

(1) Potassium aluminooxalate

(2) Potassium trioxalatoaluminate(III)

(3) Potassium aluminium (III) oxalate

(4) Potassium trioxalatoaluminate (VI)

2

Potassium trioxalatoaluminate (III)

Question no. 62

AAYAM CAREER INSTITUTE

The following two reactions are known:

$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g); \Delta H = -26.8$ kJ — eqⁿ ①

$FeO(s) + CO(g) \rightarrow Fe(s) + CO_2(g); \Delta H = -16.5$ kJ → eq② Reverse × ② → multiply

The value of ΔH for the following reaction. = +33

$Fe_2O_3(s) + CO(g) \rightarrow 2Fe(s) + CO_2(g)$ is:

(1) +6.2 kJ
(2) +10.3 kJ
(3) –43.3 kJ
(4) –10.3 kJ

ΔH = Eq② + Eqⁿ①

= +33 + (−26.8)

= 6.2 kJ

Question no. 63

AAYAM
CAREER INSTITUTE

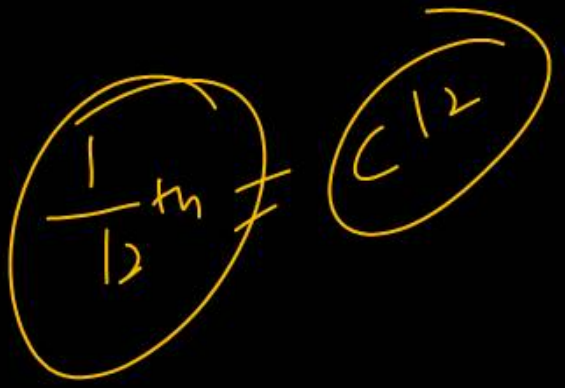
Atomic mass is defined as the

(1) mass of one atom compared with the mass of one molecule.

(2) mass of one atom compared with the mass of one atom of hydrogen.

(3) mass of one atom of any substance compared with the mass of one atom of C^{12}.

(4) None of the above



Question no. 64

AAYAM CAREER INSTITUTE

Methoxyethane and propanol are the examples of isomerism of the type.

(1) structural
(2) position
(3) functional
(4) tautomerism

3

$CH_3-O-CH_2-CH_3$

$CH_3CH_2CH_2OH$

Question no. 65

AAYAM CAREER INSTITUTE

If for the reaction

$N_2+3H_2 \rightleftharpoons 2NH_3,\ \Delta H = -16.5$ kJ/mol

then what happens if the temperature is increased?

(1) Reaction proceeds in forward direction.

(2) Reaction proceeds in backward direction.

(3) No effect on the formation of product.

(4) Product is not formed.

ΔH = - ve

↳ Exothermic Rxn

Temp ↑ Rxn backward

↓

Unfavourable

Question no. 66

pH of a saturated solution of $Ba(OH)_2$ is 12. The value of solubility product (K_{sp}) of $Ba(OH)_2$ is .

(1) 3.3×10^{-7} (2) 5.0×10^{-7}

(3) 4.0×10^{-6} (4) 5.0×10^{-6}

$pH = 12 \quad pOH = 2$

$[OH^-] = 10^{-2}$

$[OH^-] = 2S = 10^{-2}$

$S = 5\times10^{-3}$

$Ba(OH)_2 \longrightarrow Ba^{+2} + 2OH^-$

$S \quad 2S$

$K_{sp} = [Ba^{+2}][OH^-]^2$

$= [S][2S]^2$

$= 4S^3$

$K_{sp} = 4\times(5\times10^{-3})^3$

$= 4\times5\times5\times5\times10^{-9}$

$= 20\times25\times10^{-9}$

$= 500\times10^{-9}$

$= 5\times10^{-7}$

Question no. 67

AAYAM CAREER INSTITUTE

At 25°C the molar conductance at infinite dilution for the strong electrolytes NaOH, NaCl and $BaCl_2$ are 248×10^{-4}, 126×10^{-4} and 280×10^{-4} Sm^2 mol^{-1} respecticvely. $\wedge_m^0$ $Ba(OH)_2$ in Sm^2mol^{-1} is

(1) 52.4×10^{-4}

(2) 524×10^{-4}

(3) 402×10^{-4}

(4) 262×10^{-4}

$BaCl_2 + 2NaOH \rightarrow 2NaCl + Ba(OH)_2$

$(280 + 2\times248) - 2\times126 = Ba(OH)_2$

$= 280 + 496 - 252$

$= 776 - 252$

$= 524 \times 10^{-4}$

$Ba(OH)_2 = 524 \times 10^{-4}$

Question no. 68

AAYAM CAREER INSTITUTE

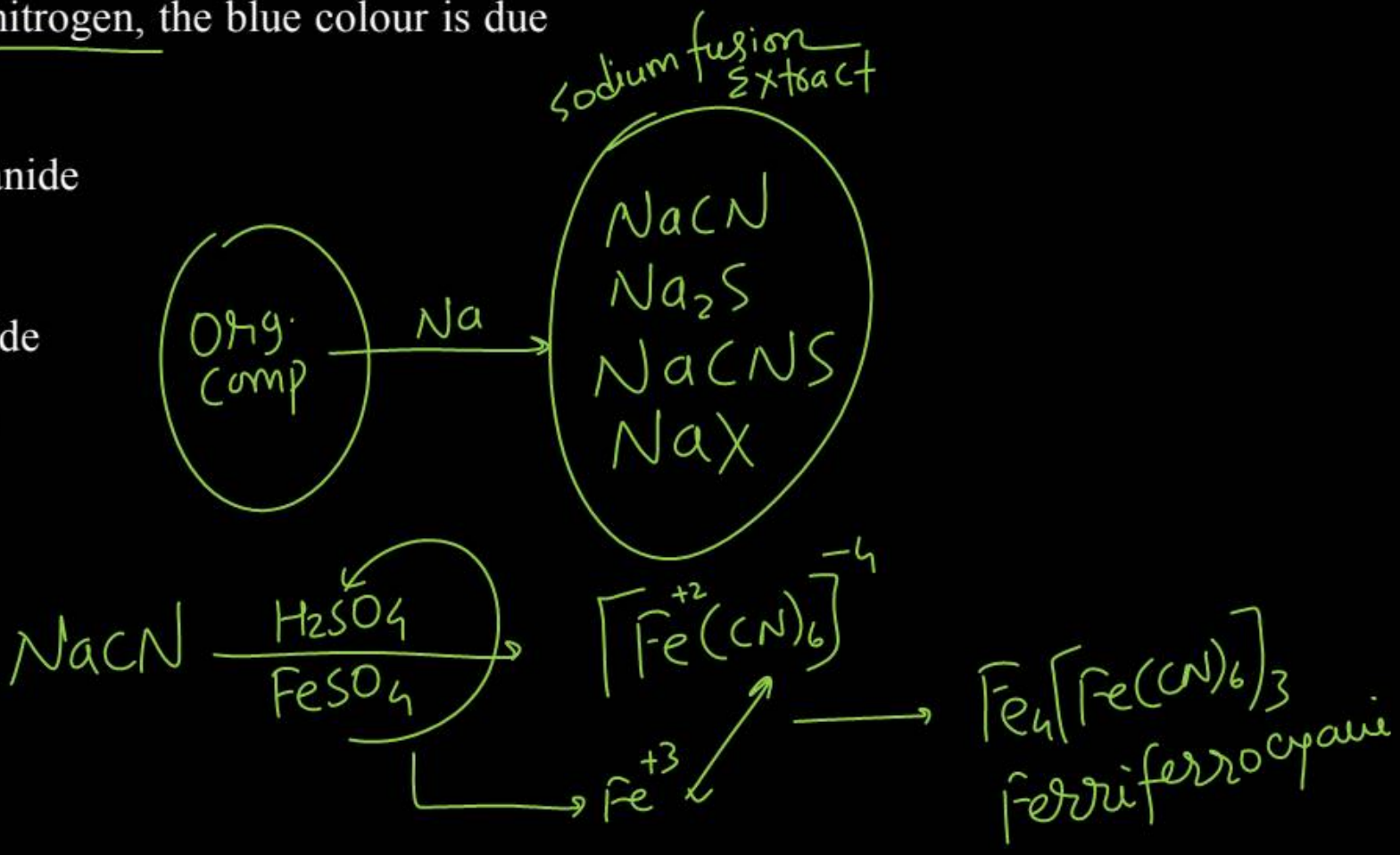
In Lassaigne's test for nitrogen, the blue colour is due to the formation of

(1) potassium ferricyanide

(2) sodium cyanide

(3) sodium ferrocyanide

(4) ferri-ferrocyanide



Question no. 69

AAYAM CAREER INSTITUTE

How many moles of $Al_2(SO_4)_3$ would be in 50 g of the substance?

(1) 0.083 mole (2) 0.952 mole

(3) 0.481 mole (4) 0.140 mole

Mw of $Al_2(SO_4)_3$

$= 27 \times 2 + 32 \times 3 + 16 \times 12$

$= 54 + 96 + 192$

$Mw = 342$

$mol = \frac{wt}{Mw} = \frac{50}{342} = 1/7$

$mol = 0.140$

Question no. 70

AAYAM CAREER INSTITUTE

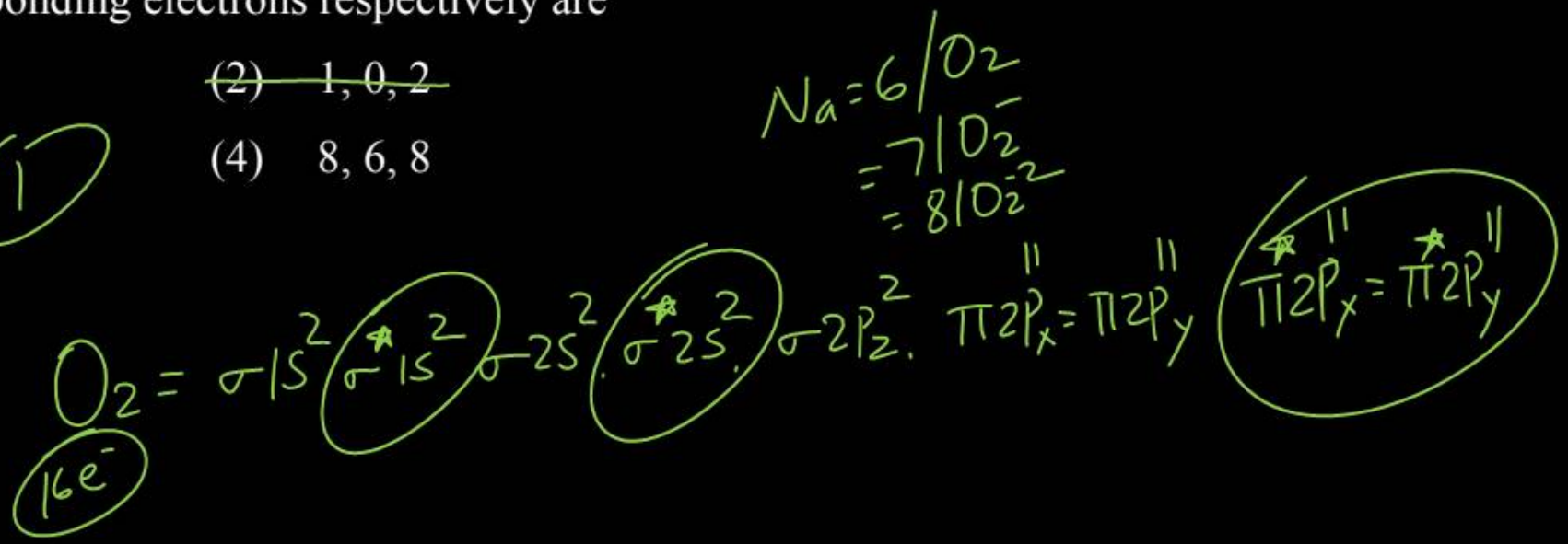
In O_2^- ,O_2 and O_2^{2-} molecular species, the total number of antibonding electrons respectively are

(1) 7, 6, 8

~~(2) 1, 0, 2~~

(3) 6, 6, 6

(4) 8, 6, 8



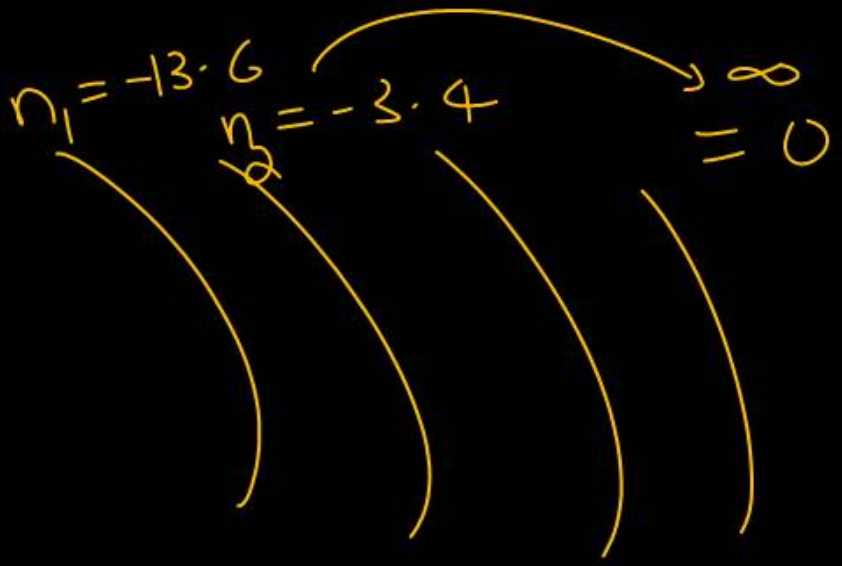
Question no. 71

AAYAM CAREER INSTITUTE

According to Bohr's theory the energy required for an electron in the Li^{2+} ion to be emitted from n = 2 state is

(1) 61.2 eV (2) 13.6 eV

(3) 30.6 eV (4) 10.2 eV



$$E_2 = -13.6 \times \frac{Z^2}{n^2}$$

$$= -13.6 \times \frac{3^2}{2^2}$$

$$= -13.6 \times \frac{9}{4}$$

$$E_2 = -30.6$$ 2nd orbit energy

$$E = 0 - (-30.6) = +30.6$$

Question no. 72

A process has $\Delta H = 200\ J\ mol^{-1}$ and $\Delta S = 40\ JK^{-1}\ mol^{-1}$. Out of the values given below, choose the minimum temperature above which the process will be spontaneous.

(1) 20 K

(2) 12 K

(3) 5 K

(4) 4 K

$\Delta G = \Delta H - T\Delta S$

$0 = \Delta H - T\Delta S$

$T\Delta S = \Delta H$

$T = \frac{\Delta H}{\Delta S} = \frac{200}{40}\ S$

$T = 5\ K$

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Question no. 73

AAYAM CAREER INSTITUTE

The major organic product in the reaction,

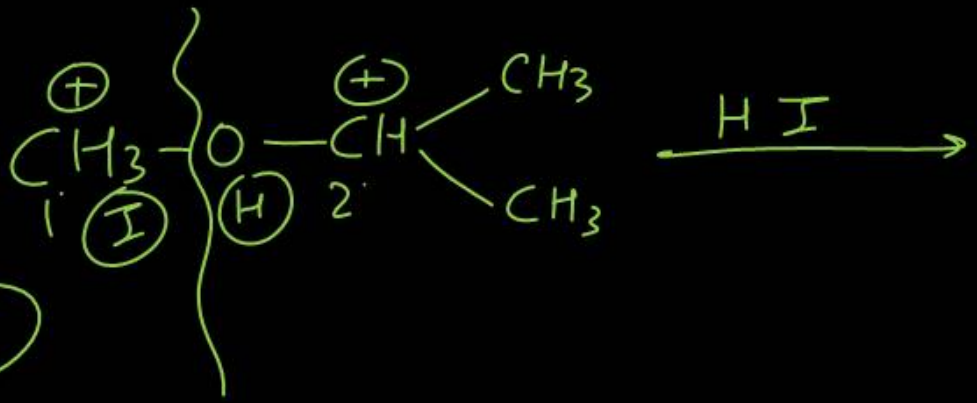
$CH_3 - O - CH(CH_3)_2 + HI \rightarrow$ Product is

(1) $ICH_2OCH(CH_3)_2$

(2) $CH_3OC(CH_3)_2$ with I

(3) $CH_3I + (CH_3)_2CHOH$

(4) $CH_3OH + (CH_3)_2CHI$



Question no. 74

AAYAM CAREER INSTITUTE

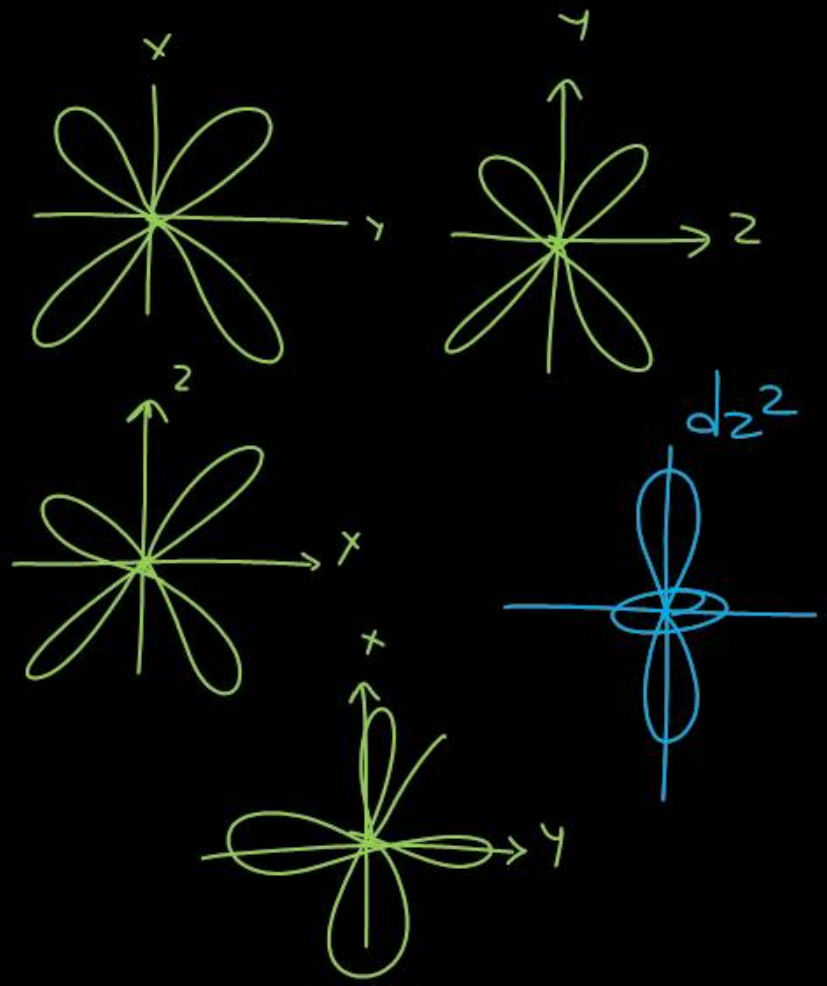
The five d-orbitals are designated as d_{xy}, d_{yz}, d_{xz}, $d_{x^2-y^2}$ and d_{z^2}. Choose the correct statement.

(1) The shapes of the first three orbitals are similar but that of the fourth and fifth orbitals are different

(2) The shapes of all five d-orbitals are similar

(3) The shapes of the first four orbitals are similar but that of the fifth orbital is different

(4) The shapes of all five d-orbitals are different



Question no. 75

AAYAM CAREER INSTITUTE

If N_x is the number of bonding electrons of an atom and N_y is the number of antibonding electrons, then the molecule/atom will be stable if

(1) $N_x > N_y$

(2) $N_x = N_y$

(3) $N_x < N_y$

(4) $N_x \leq N_y$

1

$N_x = N_b$

$N_y = N_a$

BO = +ve

$BO = \frac{N_b - N_a}{2}$

$N_b > N_a$

$N_x > N_y$

Question no. 76

AAYAM CAREER INSTITUTE

200 ml of water is added to 500 ml of 0.2 M solution.

What is the molarity of this diluted solution?

(1) 0.5010 M (2) 0.2897 M

(3) 0.7093 M (4) 0.1428 M

$M_1 = 0.2\ M$

$V_1 = 500\ ml$

$M_2 = ?$

$V_2 = V_1 + V_w$

$= 500 + 200$

$= 700$

$M_1V_1 = M_2V_2$

$0.2 \times 500 = M_2 \times 700$

$1 = M_2 \times 7$

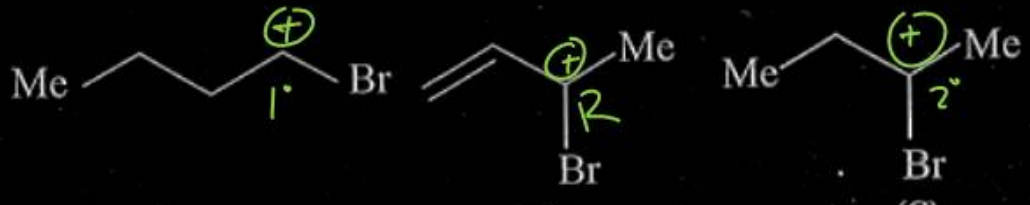
$M_2 = 1/7 = 0.142$

$M_2 = 0.142$

Question no. 77

AAYAM CAREER INSTITUTE

Consider the following bromides :



(A) (B) (C)

The correct order of SN_1 reactivity is

(1) B > C > A (2) B > A > C

(3) C > B > A (4) A > B > C

1

S_N1 Reactivity & Stability of C^+

Question no. 78

AAYAM CAREER INSTITUTE

Match List – I with List – II.

	List – I		List – II
A.	Path function	i.	No Exchange of heat and matter
B.	Isothermal change	ii	No heat transfer
C.	Isolated system	iii.	Constant temperature
D.	Adiabatic process	iv.	Heat

A – IV
B – III
C – I
D – II

(1) A-iv, B-i, C-ii, D-ii (2) A-i, B-iii, C-iv, D-ii

(3) A-iv, B-iii, C-i, D-ii (4) A-iii, B-iv, C-ii, D-i

Question no. 79

AAYAM CAREER INSTITUTE

Match List – I with List – II.

	List – I (Reaction)		List – II (Product)
A.	$CH_4 + O_2 \xrightarrow{Cu/523K/100\ atm}$	i.	HCHO
B.	$CH_4 + O_2 \xrightarrow[\Delta]{Mo_2O_3}$	ii	$(CH_3)_3COH$
C.	$C_2H_6 + O_2 \xrightarrow[\Delta]{(CH_3COO)_2\ Mn}$	iii.	CH_3OH
D.	$(CH_3)_2CH \xrightarrow[oxidation]{KMnO_4}$	iv.	CH_3COOH

Cu
Mo_2O_3
$(CH_3COO)_2Mn$

3

(1) A-iv, B-i, C-iii, D-ii (2) A-ii, B-i, C-iv, D-iii

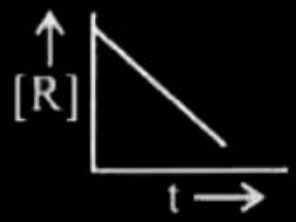
(3) A-iii, B-i, C-iv, D-ii (4) A-i, B-ii, C-iii, D-iv

Question no. 80

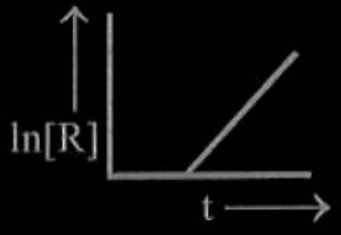
AAYAM CAREER INSTITUTE

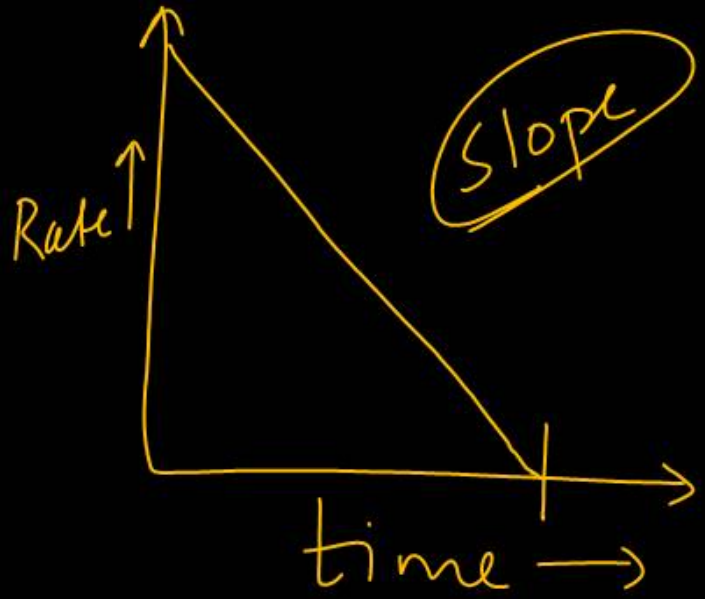
The plot that represents the zero order reaction is:

(1) 

(2) 

(3) 

(4) 



Question no. 81

AAYAM CAREER INSTITUTE

Which one of the following does not react with both, acetone and benzaldehyde?

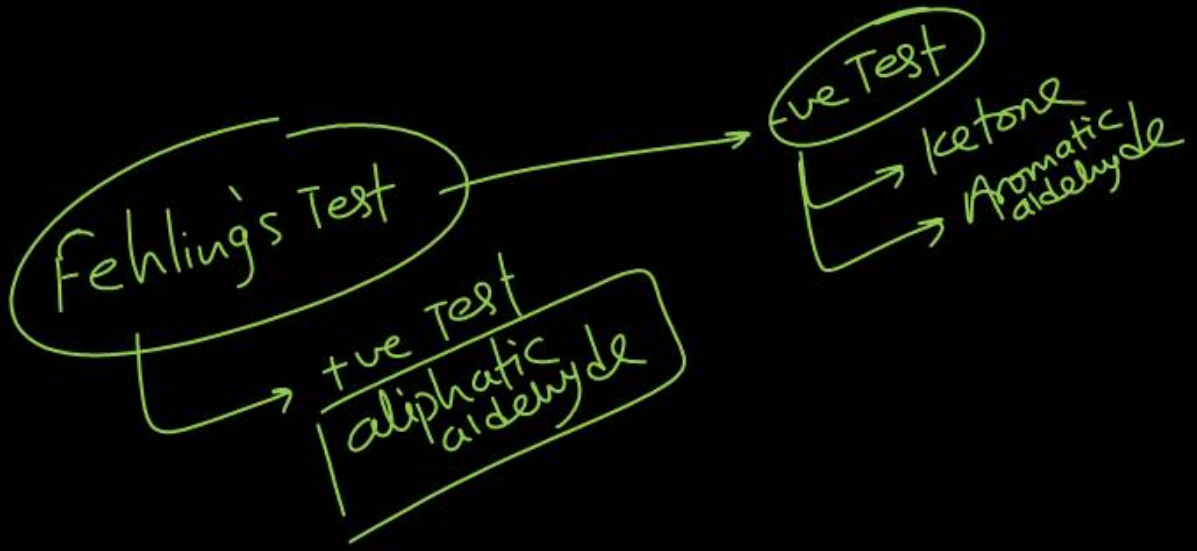
(1) Sodium hydrogen sulphite

(2) Phenyl hydrazine

(3) Fehling's solution

(4) Grignard reagent

3



Question no. 82

AAYAM CAREER INSTITUTE

Match List – I with List – II.

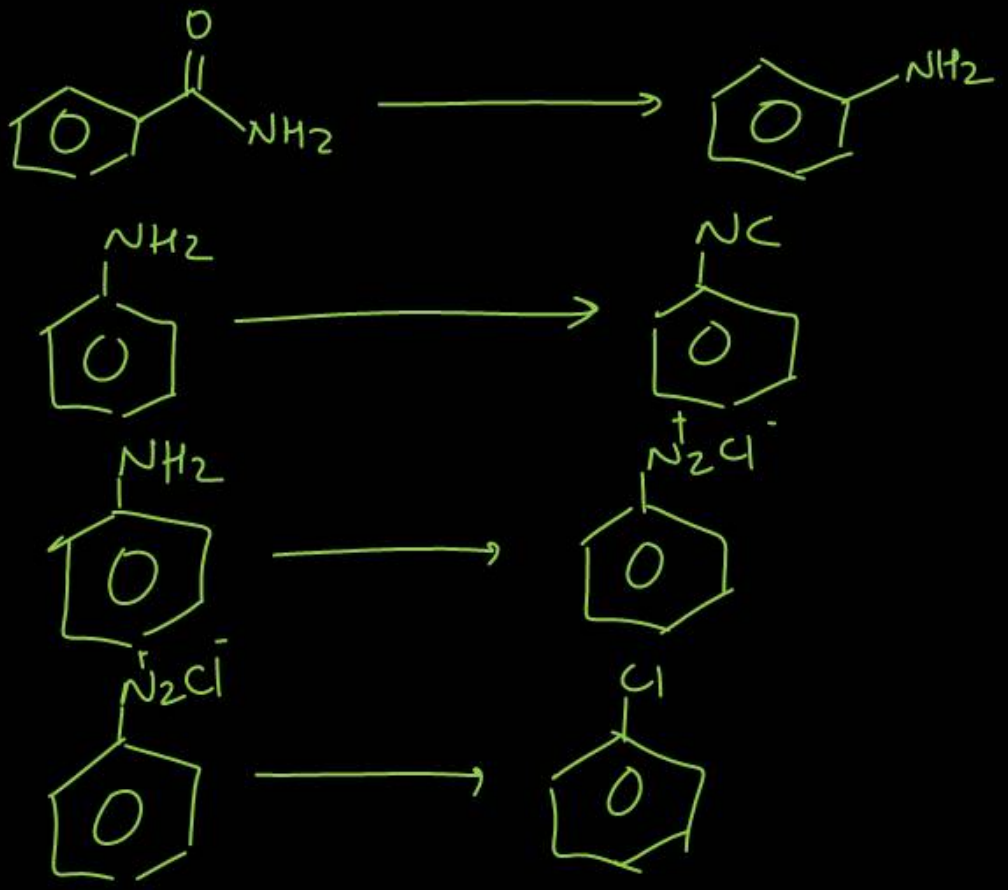
	List – I		List – II
A.	Benzenamide into aniline	i.	Carbylamine reaction
B.	Aniline into phenyl isocyanide	ii	Diazotization
C.	Aniline into benzenediazonium chloride	iii.	Hofmann bromamide reaction
D.	Benzenoediazonium chloride into chlorobenzene	iv.	Sandmeyer reaction

(1) A-iii, B-i, C-ii, D-iv

(2) A-iii, B-ii, C-i, D-iv

(3) A-iii, B-i, C-iv, D-ii

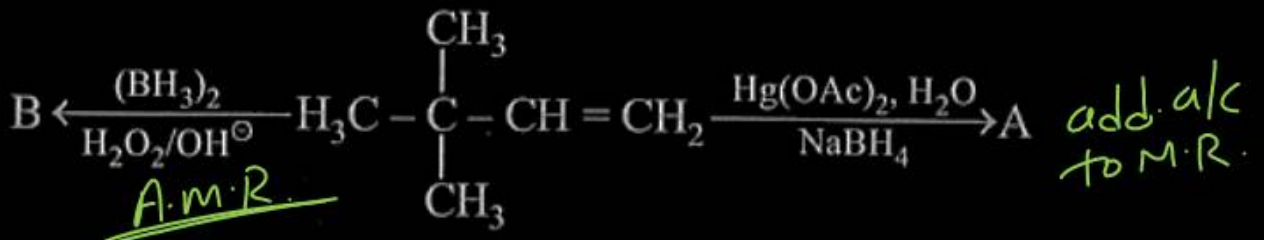
(4) A-ii, B-iii, C-iv, D-i



Question no. 83

AAYAM CAREER INSTITUTE

Choose the correct option for the following reaction.



(1) 'A' and 'B' are both Markovnikov addition products.

(2) 'A' is Markovnikov product and 'B' is anti-Markovenikov product.

(3) 'A' and 'B' are both anti-Markovnikov product.

(4) 'B' is Markovnikov and 'A' is anti-Markovnikov product.

2

Question no. 84

AAYAM CAREER INSTITUTE

For the reaction $CO\ (g) + \frac{1}{2}O_2\ (g) \rightarrow CO_2\ (g)$ Which one of the statement is correct at constant T and P?

(1) $\Delta H = \Delta E$

(2) $\Delta H < \Delta E$

(3) $\Delta H > \Delta E$

(4) ΔH is independent of physical state of the reactants

$\Delta n_g = n_P - n_R$

$= 1 - (1 + 1/2)$

$= -1/2$

$\Delta n_g = -ve$

$\Delta H < \Delta E$

$\Delta H = \Delta E + \Delta n_g RT$

Question no. 85

AAYAM CAREER INSTITUTE

The best method for the conversion of an alcohol into an alkyl chloride is by treating the alcohol with

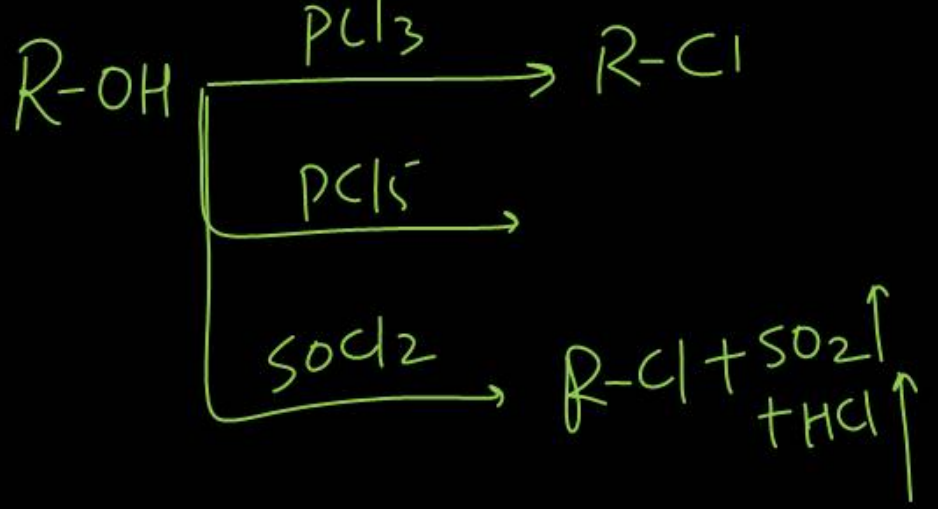
(1) PCl_5

(2) dry HCl in the presence of anhydrous $ZnCl_2$

(3) $SOCl_2$ in presence of pyridine

(4) (1), (2) and (3)

3



Question no. 86

AAYAM CAREER INSTITUTE

Which complex of Co^{2+} will have the weakest crystal field splitting-

(1) $[CoCl_6]^{4-}$

(2) $[Co(CN)6]^{4-}$

(3) $[Co(NH_3)_6]^{2+}$

(4) $[Co(en)_3]^{2+}$

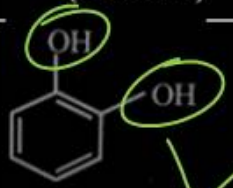
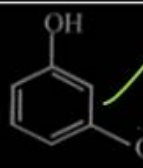
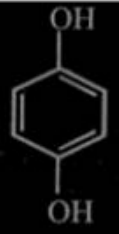
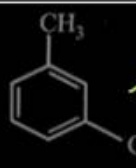
CFSE ∝ Strength of lig.

1

Question no. 87

AAYAM CAREER INSTITUTE

Match List – I with List –II.

	List – I (Molecule)		List – II (Name)
A.		i.	Resoccinol
B.		ii	Catechol
C.		iii.	m-Cresol
D.		iv.	Quinol

(1) ~~A-iii, B-ii, C-i, D-iv~~ (2) A-ii, B-i, C-iv, D-iii

(3) A-ii, B-iv, C-i, D-iii (4) ~~A-iv, B-i, C-ii, D-iii~~

2

Question no. 88

AAYAM CAREER INSTITUTE

If 0.01 M solution of an electrolyte has a resistance of 40 ohms in a cell having a cell constant of 0.4 cm^{-1}, then its molar conductance in $ohm^{-1}\ cm^2 mol^{-1}$ is

(1) 10^2 (2) 10^4

(3) 10 (4) 10^3

$$\Lambda_m = k \times \frac{1000}{M}$$

$$k = \frac{1}{R} \times \text{cell const}$$

$$\Lambda_m = \frac{1}{R} \times \text{cell const} \times \frac{1000}{M}$$

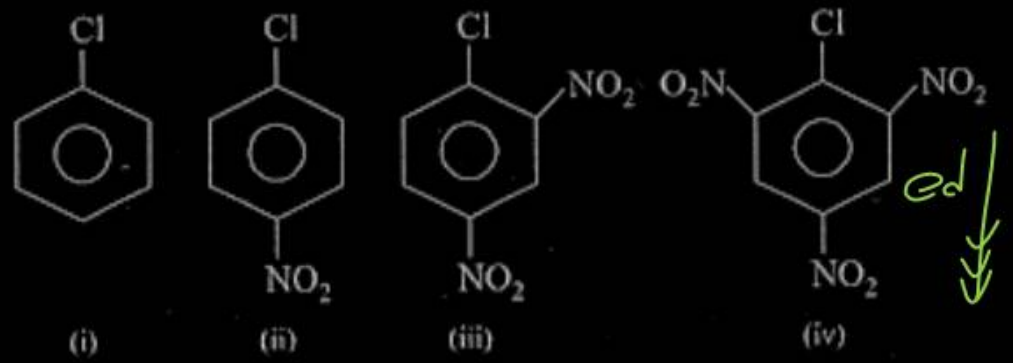
$$\Lambda_m = \frac{1}{40} \times 0.4 \times \frac{1000}{10^{-2}}$$

$$\Lambda_m = 10^3$$

Question no. 89

AAYAM CAREER INSTITUTE

The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :



S_N Reactivity $\propto \frac{1}{\text{ed on Ring}}$

ed ↓

(1) iv < iii < ii < i

(2) iv < i < ii < iii

(3) iv < i < iii < ii

(4) i < ii < iii < iv

4

Question no. 90

AAYAM CAREER INSTITUTE

Match List-I with List-II.

	List-I (Anion)		List-II (Test)
A.	CO_3^{2-}	i.	Colourless gas which truns lead acetate paper black.
B.	S^{2-}	ii.	Colourless gas which turns acidified potassium dichromate solution green.
C.	SO_3^{2-}	iii.	Brown fumes which turns acidified KI solution to starch blue.
D.	NO_2^-	iv.	Colourless gas evolved with brisk effervescence, which turns lime water milky.

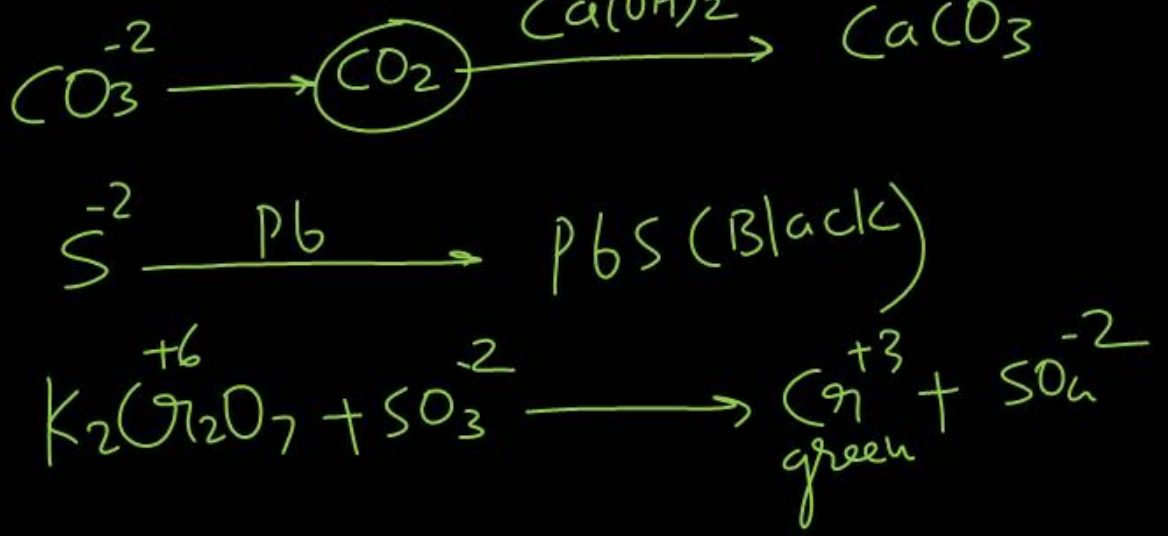
Choose the correct answer from options given below:

(1) A – iii, B – i, C – ii, D – iv

(2) A – ii, B – i, C – iv, D – iii

(3) A – iv, B – i, C – iii, D – ii

(4) A – iv, B – i, C – ii, D – iii



Question no. 91

AAYAM CAREER INSTITUTE

Match List – I with List II

	List – I		List – II
A.	Priestley	I.	Determined the action spectrum of chlorophyll
B.	Jan Ingenhousz	II.	Provided evidence that in green parts of plant glucose is made & plant glucose
C.	Sachs	III.	Plants purify air only in the presence of light
D.	Engelmann	IV.	Revealed the essential role of air in the growth of plants

Choose the correct answer from the options given below

(1) A – IV; B- III ; C – II ; D – I

(2) A – IV; B- I ; C – II ; D – III

(3) A – II; B- I ; C – IV ; D – III

(4) A – II; B- I ; C – III ; D – IV

Question no. 92

AAYAM CAREER INSTITUTE

Daisy performed an experiment with plant starch. She added iodine (I_2) to a sample of starch solution and observed a distinct blue colour. She also tried iodine with cellulose from cotton and noticed no colour change. Which of the following statement correctly explains her observations ?

(1) Starch forms helical structures that trap iodine, giving a blue color; cellulose does not form helices.

(2) Both starch and cellulose form helices, but only starch reacts with iodine.

(3) Cellulose forms helices that trap iodine, giving a blue colour; starch does not

(4) Both starch and cellulose do not react with iodine

Starch + I_2 = Blue.

Cotton (cellulose) + I_2 = No-color

1

Question no. 93

AAYAM CAREER INSTITUTE

Given below are two statements :

Statement I : The chromosomal material become untangled during the process of chromatin condensation

Statement II : In the S and G_2 phase, the new DNA molecules formed are not distinct but interwind

NCERT

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

(1) Both statement Iand statement II are correct

(2) Both statement Iand statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Question no. 94

AAYAM CAREER INSTITUTE

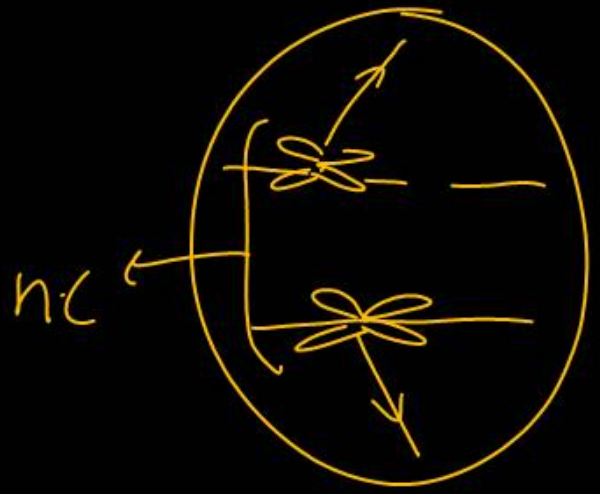
During Anaphase – I of meiosis

(1) homologous chromosomes separate

(2) non – homologous autosomes separate

(3) sister chromatids separate

(4) non – sister chromatids separate



Question no. 95

AAYAM CAREER INSTITUTE

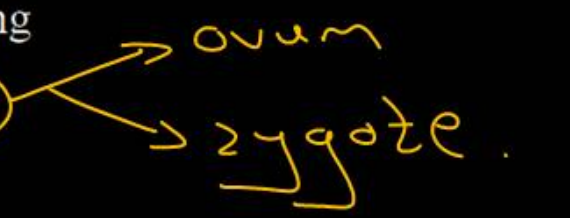
The ciliated columnar epithelial cells in humans occur in

(1) Eustachian tube and stomach lining

(2) bronchioles and fallopian tubes

(3) bile duct and oesophagus

(4) fallopian tubes and urethra



Question no. 96

AAYAM CAREER INSTITUTE

Glomerular filtration rate (GFR) in a healthy individual is approximately

(1) 100 ml/minute, i.e., 180 liters per day.

(2) 125 ml/minute, i.e., 180 liters per day.

(3) 120 ml/minute, i.e., 100 liters per day.

(4) 130 ml/minute, i.e., 120 liters per day.

2

Question no. 97

AAYAM CAREER INSTITUTE

Determination of one amino acid by more than one codon is due to

(1) degeneracy of genetic code

(2) continuous nature of genetic code

(3) punctuation in genetic code

(4) universal nature of genetic code

Question no. 98

AAYAM CAREER INSTITUTE

Point mutation may occur due to

(1) alteration in DNA sequence

(2) change in a single base pair of DNA

(3) deletion of a segment of DNA

(4) gain of a segment in DNA

Question no. 99

AAYAM CAREER INSTITUTE

Flowering in pineapple is promoted by:

(1) GA_1

(2) C_2H_4

(3) NAA

(4) Kinetin

Question no. 100

AAYAM CAREER INSTITUTE

Which of the following statements is not correct for mosses ?

(1) The predominant stage of the life cycle of a moss is the gametophyte

(2) The first stage is the proteome stage

(3) The second stage is the leafy stage

(4) Vegetative reproduction in mosses is by regeneration

Question no. 101

AAYAM CAREER INSTITUTE

The flow chart shows an important concept in the genetic implication of DNA. Fill in the blanks A to C

(1) (A) – transcription, (B) – replication, (C) – James Watson

(2) (A) – translation, (B) – transcription, (C) – Erwin Chargaff

(3) (A) – transcription, (B) – translation, (C) – Francis crick

(4) (A) – translation, (B) – transcription, (C) – Rosalind Franklin

Question no. 102

AAYAM CAREER INSTITUTE

Choose the correct statement regarding ecological pyramids

A. The relationship between organisms at different trophic levels is expressed in terms of number, biomass and energy.

B. Any calculations of energy content, biomass or number has to include one group of organism at that trophic level.

C. In most ecosystems, all the pyramids of number, biomass and energy are upright.

D. The pyramid of biomass in sea is generally inverted.

E. Pyramid of energy is inverted.

(1) A, C and D only (2) A and E only

(3) B and D only (4) A and D only

Question no. 103

AAYAM CAREER INSTITUTE

Sunflower family is unique due to :

A. Composite flowers (capitulum inflorescence)

B. Ray florets and disc florets

C. Inferior ovary with bicarpellary condition

D. Cypsela fruit

Choose the correct answer :

(1) A, B and D only (2) A, C and D only

(3) A, B, C and D (4) A and B only

Question no. 104

AAYAM CAREER INSTITUTE

Match List – I with List – II.

	List – I (Disorders)		List – II (Symptoms)
A.	Asthma	I.	Long exposure of dust damage the lungs
B.	Fibrosis	II.	Causing wheezing due to inflammation of bronchi
C.	Occupational Respiratory Disorder	III.	A chronic disorder in which alveolar walls are damaged
D.	Emphysema	IV.	Proliferation of fibrous tissue

Choose the correct answer from the options given below :

(1) A – IV; B – II ; C – III ; D - I

(2) A – IV; B – III ; C – II ; D - I

(3) A – III; B – I ; C – II ; D - IV

(4) A – II; B – IV ; C – I ; D – III

Question no. 105

AAYAM CAREER INSTITUTE

Which one of the following techniques made it possible to genetically engineer living organism ?

(1) Recombinant DNA techniques

(2) X –ray diffraction

(3) Heavier isotope labelling

(4) Hybridization

Question no. 106

AAYAM CAREER INSTITUTE

Abscission of older mature leaves take place when :

(1) Auxin increase

(2) Abscisic acid decrease

(3) Auxin decrease

(4) GA decrease

Question no. 107

AAYAM CAREER INSTITUTE

Given below are two statements :

Statement I : Ecosystem is a functional unit of nature

Statement II : It is composed of biological community and components of the physical environment

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

(1) Both statement I and statement II are correct

(2) Both statement I and statement II are incorrect

(3) Statement I is correct but statement II is incorrect

(4) Statement I is incorrect but statement II is correct

Question no. 108

AAYAM CAREER INSTITUTE

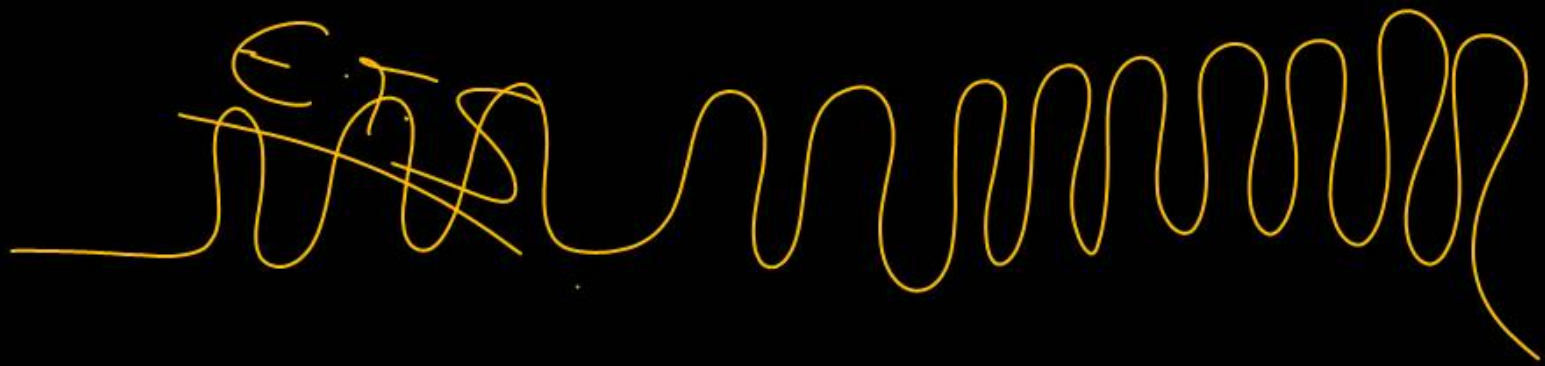
Mitochondrial cristae are sites of

(1) breakdown of macromolecules

(2) protein synthesis

(3) phosphorylation of flavoproteins

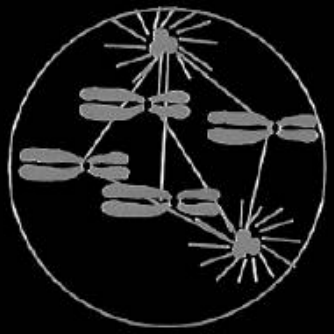
(4) oxidation – reduction reactions



Question no. 109

AAYAM CAREER INSTITUTE

Which one is the right option for the given diagram ?



→ Transition to Metaphase

(1) Metaphase (mitosis)

(2) Anaphase II (meiosis)

(3) Metaphase I (meiosis)

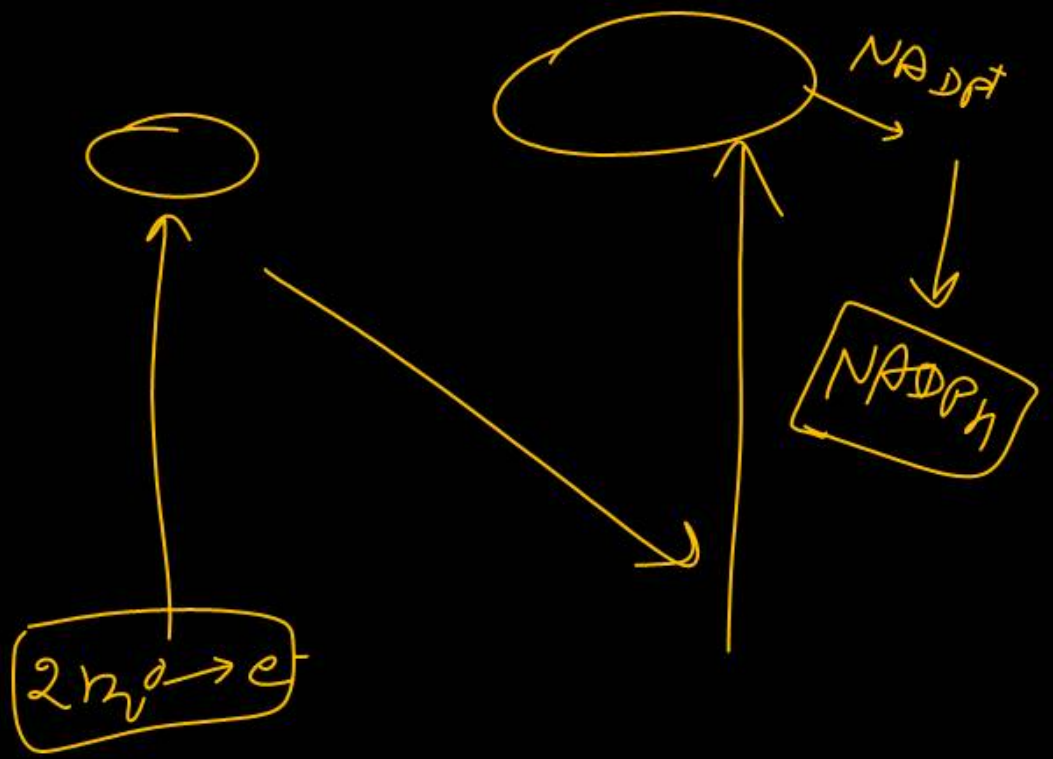
(4) Anaphase (mitosis)

Question no. 110

AAYAM CAREER INSTITUTE

The electrons that are released by the photolysis of water during non – cyclic photophosphorylation, ultimately end up in :

(1) glucose
(2) ATP
(3) H_2O
(4) NADPH



Question no. 111

AAYAM CAREER INSTITUTE

Correct equation that represents the photolysis of water is

(1) $2H_2O \rightarrow 4H^+ + O_2 + 4e^-$

(2) $H_2O \rightarrow 4H^+ + O_2 + 4e^-$

(3) $4H_2O \rightarrow 4H^+ + O_2 + 4e^-$

(4) $2H_2O \rightarrow 4H^+ + 2O_2 + 2e^-$

Question no. 112

AAYAM CAREER INSTITUTE

The heterosporous pteriodophyte belonging to the class lycopsida is

(1) Selaginella
(2) Psilotum
(3) Equisetum
(4) Pleris

Question no. 113

AAYAM CAREER INSTITUTE

A sterile stamen is known as

(1) staminode

(2) anther

(3) pollen grain

(4) filament

Question no. 114

AAYAM CAREER INSTITUTE

From the statements given below choose the correct option

A. The shape of the cells may vary with the function they perform.

B. Human RBC is about 7.0 μm in diameter

C. Cytoplasm is the main area of cellular activities.

D. Various chemical reactions occur in cytoplasm to keep the cell in the living state

E. Cell is a non – lving rigid structure

(1) A, B, C and D only (2) A and B only

(3) D only (4) B and D only

Question no. 115

AAYAM CAREER INSTITUTE

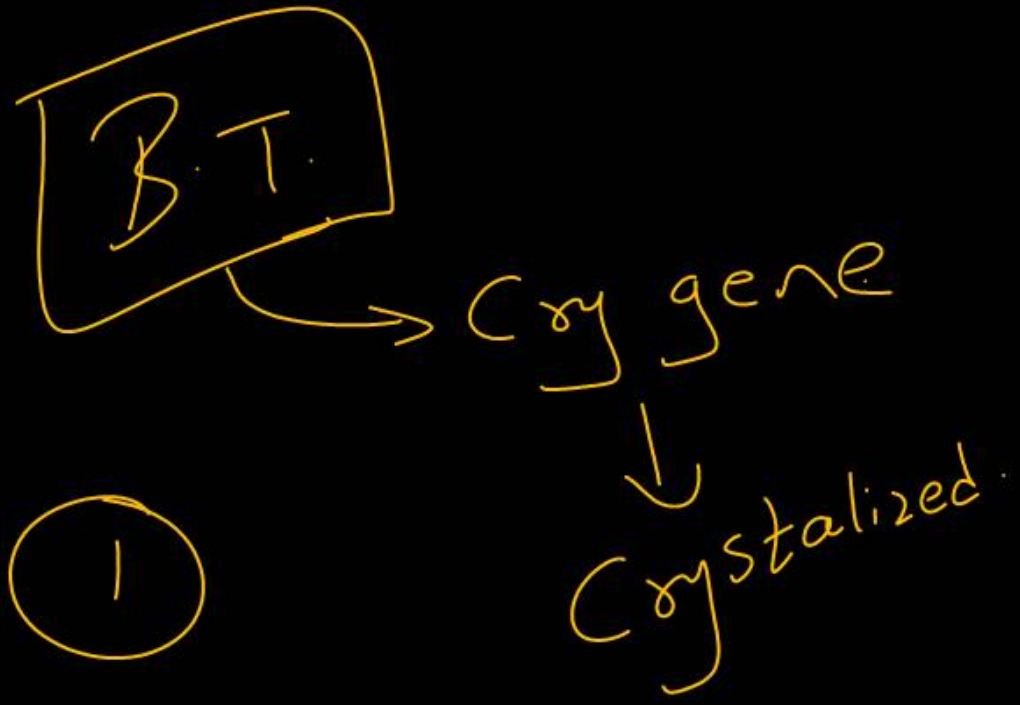
CryIIAb and cryIAb produce toxins that control

(1) cotton bollworms and corn borer respectively

(2) cotton borer and cotton bollworms respectively

(3) tobacco budworms and nematodes respectively

(4) nematodes and tobacco budworms respectively



Question no. 116

AAYAM CAREER INSTITUTE

A conjoint and open vascular bundle will be observed in the transverse section of

(1) monocot root
(2) monocot stem
(3) dicot root
(4) dicot stem

Question no. 117

AAYAM CAREER INSTITUTE

The reaction that is responsible for the primary fixation of CO_2 is catalysed by :

(1) RuBP carboxylase

(2) PEP carboxylase

(3) RuBP carboxylase and PEP carboxylase (PEPcase)

(4) PGA synthase

Question no. 118

AAYAM CAREER INSTITUTE

Mannitol is the stored food in

(1) Chara

(2) Porphyra

(3) Fucus

(4) Gracilaria

Question no. 119

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I		List – II
A.	Complex I	I.	Cytochrome bc_1 complex
B.	Complex II	II.	NADH dehydrogenase
C.	Complex III	III.	$FADH_2$ dehydrogenase
D.	Complex IV	IV.	Cytochrome c oxidase

Choose the correct answer from the options given below :

(1) A – III; B – II ; C – I ; D - IV

(2) A – III; B – I ; C – II ; D - IV

(3) A – II; B – III ; C – I ; D - IV

(4) A – IV; B – I ; C – II ; D - III

Question no. 120

AAYAM CAREER INSTITUTE

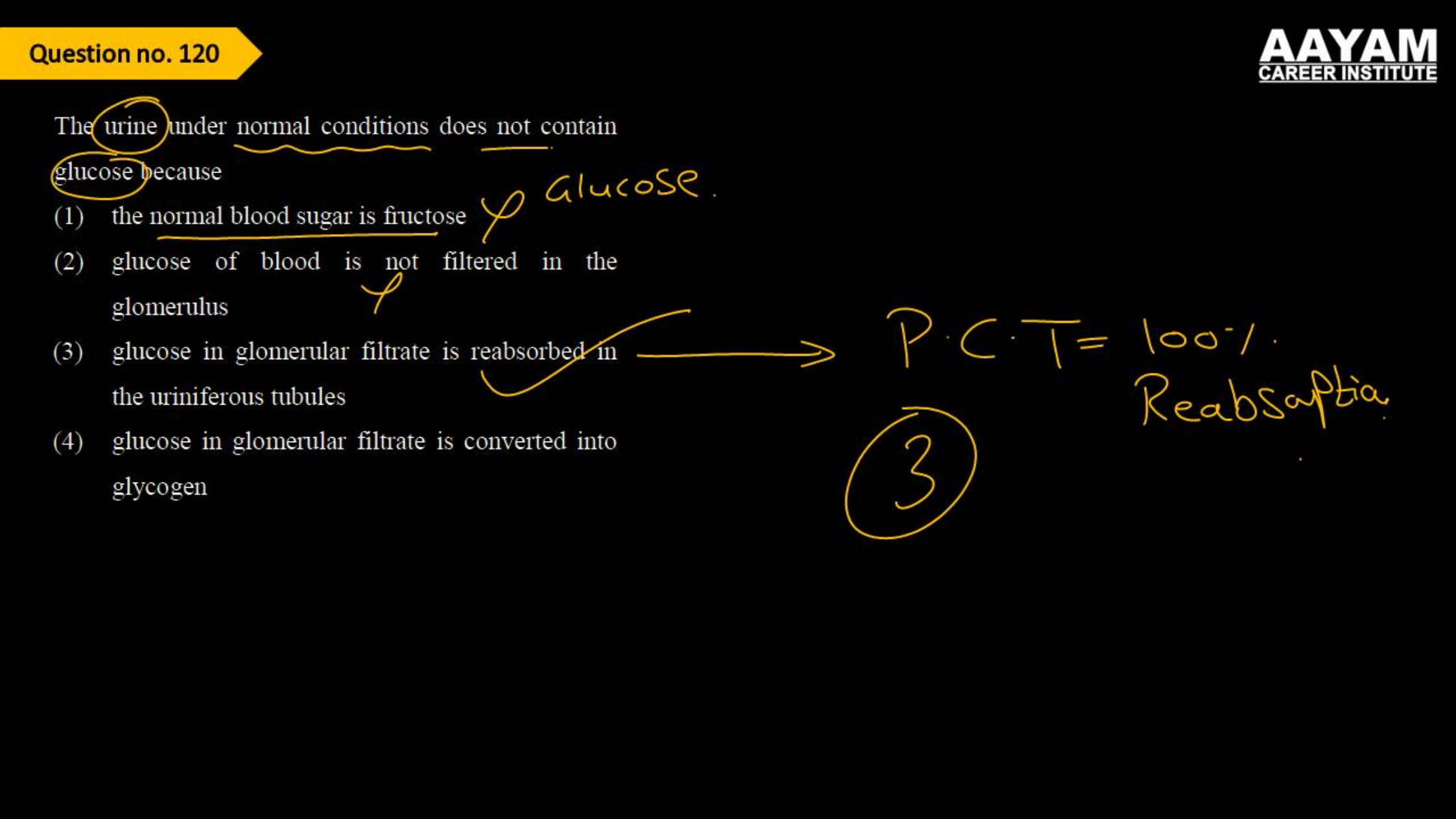
The urine under normal conditions does not contain glucose because

(1) the normal blood sugar is fructose

(2) glucose of blood is not filtered in the glomerulus

(3) glucose in glomerular filtrate is reabsorbed in the uriniferous tubules

(4) glucose in glomerular filtrate is converted into glycogen



Question no. 121

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I (Organic Compounds)		**List – II** (Examples)
A.	Fatty acid	I.	Glutamic acid
B.	Phospholipid	II.	Tryptophan
C.	Aromatic amino acid	III.	Lecithin
D.	Acidic amino acid	IV.	Palmitic acid

Choose the correct answer from the options given below :

(1) A – I; B – II ; C – III ; D - IV

(2) A – IV; B – III ; C – II ; D - IV

(3) A – II; B – III ; C – IV ; D - I

(4) A – III; B – IV ; C – I ; D - II

Question no. 122

AAYAM CAREER INSTITUTE

Significance of heat shock method in bacterial transformation is to facilitate

(1) Binding of DNA to the cell wall

(2) Uptake to DNA through membrane transport proteins

(3) Uptake of DNA through transient pores in the bacterial cell wall

(4) Expression of antibiotic resistance gene

Question no. 123

AAYAM CAREER INSTITUTE

From the statements given below choose the correct option

A. Vasa recta is lacking in cortical nephrons.

B. Maximum number of nephrons in kidney are juxtamedullary type.

C. DCT of many nephrons open into collecting tubule.

D. During summer, when body loses lots of water by evaporation, the releases of ADH is suppressed.

E. When someone drinks lot of water, ADH release is suppressed.

(1) A, B and C only (2) B, C and E only

(3) C, D and E only (4) A, C, D and E only

Question no. 124

AAYAM CAREER INSTITUTE

Which of the following are not the effects of Parathyroid hormone ?

A. Stimulates the process of bone restoration

B. Decrease Ca^{2+} level in blood

C. Reabsorption of Ca^{2+} by renal tubules

D. Decreases the absorption of Ca^{2+} from digested food

E. Increases metabolism of carbohydrates

Choose the most appropriate answer from the options given below :

(1) B, D and E only (2) A and E only

(3) B and C only (4) A and C only

Question no. 125

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I		List – II
A.	Auxin	I.	Fruit ripening
B.	Cytokinins	II.	Apical dominance
C.	Abscisic acid	III.	Antagonistic to GAs
D.	Ethylene	IV	Delay of leaf senescence

Choose the correct answer from the options given below

(1) A – IV; B – II ; C – III ; D - I

(2) A – II; B – IV ; C – III ; D - I

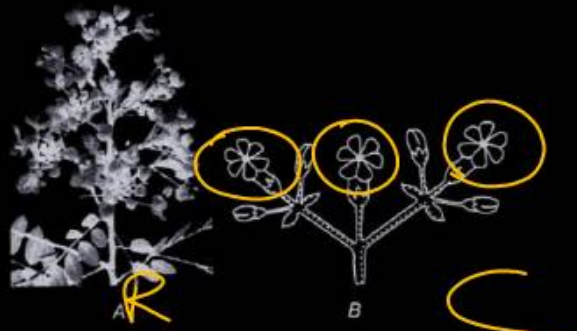
(3) A – II; B – I ; C – III ; D - IV

(4) A – IV; B – III ; C – II ; D – I

Question no. 126

AAYAM CAREER INSTITUTE

Choose the correct option for A and B



(1) A – Cymose, B - Racemose

(2) A – Racemose, B - Cymose

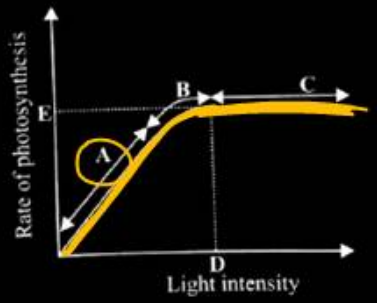
(3) A – Racemose, B - Racemose

(4) A – Cymose, B - Cymose

Question no. 127

AAYAM CAREER INSTITUTE

The given figure shows the graph of light intensity (on x-axis) on the rate of photosynthesis (on y-axis). Few points are marked as A, B, C, D and E



	List – I		List – II
A.	Limiting factor in region A	I.	Some factor other than light intensity is becoming the limiting factor
B.	B represents	II.	Light is no longer limiting factor
C.	C represents	III.	Light Intensity
D.	D represents	IV	Saturation point for light intensity

Choose the correct answer from the options given below

(1) A – I; B – II ; C – III ; D - IV

(2) A – III; B – I ; C – II ; D - IV

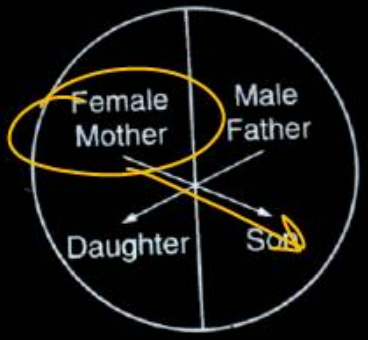
(3) A – IV; B – II ; C – I ; D - III

(4) A – I; B – IV ; C – III ; D – II

Question no. 128

AAYAM CAREER INSTITUTE

The given figure represents the inheritance pattern of a certain type of traits in humans



X-linked recessive.

Which one of the following conditions could be an example of this pattern ?

(1) Thalassemia (2) Haemophilia

(3) Phenylketonuria (4) Sickle cell anaemia

Question no. 129

AAYAM CAREER INSTITUTE

Mass of living matter at a trophic level in an area at any time is called

(1) standing crop
(2) deteritus
(3) humus
(4) All

Question no. 130

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I		List – II
A.	Operator site	I.	Binding site for RNA polymerase
B.	Promoter site	II.	Binding site for repressor molecule
C.	Structural gene	III.	Codes for enzyme protein
D.	Regulator gene	IV	Codes for repressor molecules

Choose the correct answer from the options given below :

(1) A – II; B – I ; C – III ; D - IV

(2) A – II; B – I ; C – IV ; D - III

(3) A – IV; B – III ; C – I ; D - II

(4) A – II; B – III ; C – I ; D - IV

Question no. 131

AAYAM CAREER INSTITUTE

Histones are rich in

(1) alanine and glycine (2) lysine and arginine

(3) histidine and serine (4) cysteine and tyrosine

Question no. 132

AAYAM CAREER INSTITUTE

Blocking of arteries due to deposition of fats and calcium is called :

(1) Arteriosclerosis (2) Atherosclerosis

(3) Emphysema (4) Heart syndrome

2

Question no. 133

AAYAM CAREER INSTITUTE

Analogous organs are :

(1) different in origin but perform similar functions.

(2) common in origin and perform common functions.

(3) common in origin but perform different functions.

(4) different in origin and perform different functions.

Question no. 134

AAYAM CAREER INSTITUTE

Volume of urine is regulated by

(1) aldosterone

(2) aldosterone and ADH

(3) aldosterone, ADH and testosterone

(4) ADH alone

Question no. 135

AAYAM CAREER INSTITUTE

Which of the following is not a chordate character ?

(1) Presence of paired pharyngeal gill slits

(2) Ventral heart

(3) Solid and ventral nerve cord

(4) Presence of post – anal tail

3

Question no. 136

AAYAM CAREER INSTITUTE

The protein α-1 antitrypsin is used to treat which of the following disease?

(1) Cancer

(2) Rheumatoid arthritis

(3) Emphysema

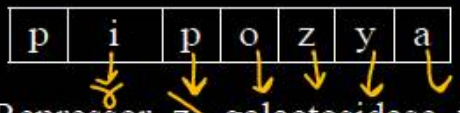
(4) ADA deficiency disease in children

3

Question no. 137

AAYAM CAREER INSTITUTE

In the Diagram given figure of Lac operon



(1) i – Repressor, z - galactosidase, y – Permease, a - Transacetylase

(2) i – Inhibitor, z – Repressor, y – Transacetylase, a - Permease

(3) i – Inducer, z - β-galactosidase, y – Permease, a - Repressor

(4) i - β - galactosidase, z – Repressor, y – Permease, a - Transacetylase

Question no. 138

AAYAM CAREER INSTITUTE

Who proposed that the first form of life come from pre – existing non – living molecules ?

(1) Oparin and Haldane

(2) de Vries and Sturtevant

(3) Darwin and Lamarck

(4) Louis Pasteur and Miller

Question no. 139

AAYAM CAREER INSTITUTE

Columns of Bertini in the kidneys of mammals are formed as extensions of

(1) Cortex into medulla

(2) Cortex into pelvis

(3) Medulla into pelvis

(4) Pelvis into ureter

Question no. 140

AAYAM CAREER INSTITUTE

Rearrange the events of life cycle of a retrovirus

A. New viral RNA produced by infected cell

B. Reverse transcription

C. New virus particles inject into other cells

D. Viral RNA introduced into the cell

E. Viral DNA incorporates into host genome

Choose the correct answer from options given below :

(1) A, B, D, E, C

(2) B, E, D, A, C

(3) C, A, B, D, E

(4) D, B, E, A, C

Question no. 141

AAYAM CAREER INSTITUTE

From the statements given below choose the correct option :

A. Tapetum nourishes the developing pollen grains

B. Hilum represents the junction between ovule and funicular

C. In aquatic plants such as water hyacinth and water lily, pollination is by water

D. The primary endosperm nucleus is triploid

(1) A and B only (2) A, B and D only

(3) B, C and D only (4) A and D only

Question no. 142

AAYAM CAREER INSTITUTE

Conditions of a karyotype $2n \pm 1$ and $2n \pm 2$ are called

(1) aneuploidy (2) polyploidy

(3) allopolyploidy (4) monosomy

Question no. 143

AAYAM CAREER INSTITUTE

A particular species of plant produces light, non – sticky pollen in large numbers and its stigmas are long and feathery. These modifications facilitate pollination by

(1) insects
(2) water
(3) wind
(4) animals

Question no. 144

AAYAM CAREER INSTITUTE

Match List – I with List - II

	List – I		List – II
A.	IAA	I.	Ripening of fruits
B.	ABA	II.	Bolting
C.	Ethylene	III.	Stomatal closure
D.	GA	IV	Weed – free lawns

Choose the correct answer from the options given below :

(1) A – IV; B – III; C – I; D - II

(2) A – I; B – III; C – IV; D - II

(3) A – IV; B – I; C – II; D - III

(4) A – II; B – III; C – IV; D - I

Question no. 145

AAYAM CAREER INSTITUTE

Which one of the following is the correct matching of the events occuring during menstrual cycle ?

(1) Proliferative phase : Rapid regeneration of myometrium and matruation of Graafian follicle

(2) Development of corpus luteum : Secretory phase and increased secretion of progesterone

(3) Menstruation : Breakdown of myometrium and ovum not fertilised

(4) Ovulation : LH and FSH attain peak level and sharp fall in the secretion of progesterone

Question no. 146

AAYAM CAREER INSTITUTE

What changes occur when nicotine comes in contact with the brain ?

(1) Adrenaline release

(2) Serotonin release

(3) Dopamine release

(4) Noradrenaline release

3

Question no. 147

AAYAM CAREER INSTITUTE

Given below are some events :

A. Contraction of abdominal muscles

B. Increase in the volume of thoracic chmaber in the dorso – ventral axis

C. Diaphragm becomes dome - shaped

D. Ribs and sternum raised from original position

Select the option with only correct events w.r.t. normal inspiration in man.

(1) C and D only

(2) A and C only

(3) A and B only

(4) B and D only

Question no. 148

AAYAM CAREER INSTITUTE

Arrange the given steps of respiration in the sequence of their occurrence.

A. Diffusion of gases, O_2 and CO_2 across the alveolar membrane.

B. Transport of gases by the blood.

C. Utilisation of O_2 by the cells for catabolic reactions and the resultant release of CO_2.

D. Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.

E. Diffusion of O_2 and CO_2 between the blood and tissue.

(1) D – A – B – E – C (2) C – B – E – A – D

(3) E – D – C – B – A (4) A – B – C – D – E

Question no. 149

AAYAM CAREER INSTITUTE

Which field of study did PanchananMeheshwari significantly contribute to?

(1) Genetics

(2) Ecology

(3) Embryology and Tissue Culture

(4) Paleobotany

Question no. 150

AAYAM CAREER INSTITUTE

From the statements given below choose the option that are true for a typical female gametophyte of a flowering plant.

A. It is eight–nucleate and seven–celled at maturity.

B. It is free–nuclear during the development.

C. It is situated in side the integument, but outside the nucleus.

D. It has an egg apparatus situated at the chalazal end.

(1) A and D only (2) B and C only

(3) A and B only (4) B and D only

Question no. 151

AAYAM CAREER INSTITUTE

An advantage of cleistogamy is that

(1) it leads to greater genetic is that

(2) seed dispersal is more efficient and wide spread.

(3) each visit of pollinator brings hundreds of pollen grains.

(4) seed set is not dependent upon pollinators.

Question no. 152

AAYAM CAREER INSTITUTE

Auxin herbicide is

(1) NAA

(2) IAA

(3) 2, 4–D

(4) IBA

Question no. 153

AAYAM CAREER INSTITUTE

SNP which is pronounced as "snips" stands for

(1) small nuclear protein

(2) single nucleotide particle

(3) single nucleotide polymorphism

(4) small nicking points.

Question no. 154

AAYAM CAREER INSTITUTE

A wasp pollinating a fig flower is an example of

(1) competition
(2) predation
(3) parasitism
(4) mutualism

Question no. 155

AAYAM CAREER INSTITUTE

Which one the following correctly explains the function of a specific part of a human nephron?

(1) Podocytes : Create minute spaces (slit pores) for the filtration of blood into the Bowman's capsule.

(2) Henle's loop : Most reabsorption of the major substances from the glomerular filtrate.

(3) Distal convoluted tubule: Reabsorption of K^+ ions into the surrounding blood capillaries.

(4) Afferent arteriole: Carries the blood away from the glomerular towards renal vein.

Question no. 156

AAYAM CAREER INSTITUTE

If Henle's loop were absent from mammalian nephron which of the following is to be expected

(1) there will be no urine formation

(2) there will be hardly any change in the quality and quantity of urine formed

(3) the urine will be more concentrated

(4) the urine will be more dilute.

4

Question no. 157

AAYAM CAREER INSTITUTE

Match List–I with List–II.

	List–I		List–II
A.	Cerebrum	I.	Body temperature
B.	Cerebellum	II.	Controls vision and hearing
C.	Hypothalamus	III.	Controls the rate of heart beat
D.	Medulla oblongata	IV.	Maintains body posture

Choose the correct answer from options given below:

(1) A–II, B–IV, C–I, D–III

(2) A–IV, B–II, C–III, D–I

(3) A–I, B–IV, C–III, D–II

(4) A–III, B–IV, C–I, D–II

Question no. 158

AAYAM CAREER INSTITUTE

Pollination by water occurs in all of the following except:

(1) Vallisneria
(2) Zostera
(3) Hydrilla
(4) Commelina

Question no. 159

AAYAM CAREER INSTITUTE

You are given an unknown plant to study in the laboratory. You find that it has chlorophyll, no xylem. It has multicellular sex organ. Its gametophyte stage is free living. The plant probably belongs to

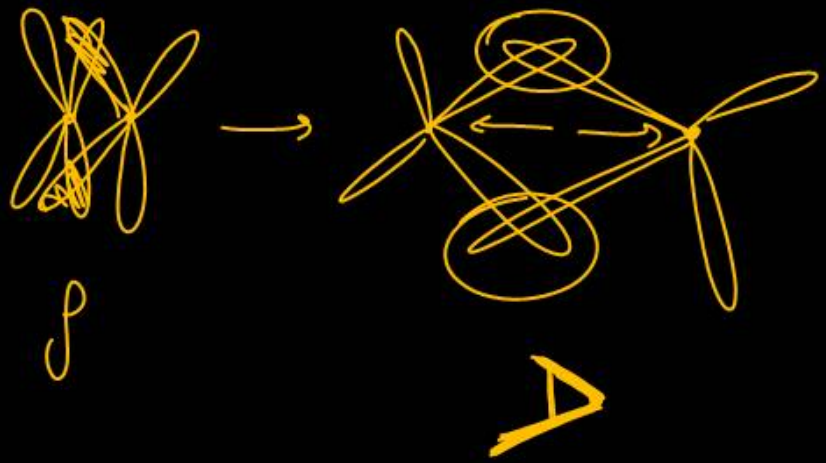
(1) chlorophyceae
(2) bryophyte
(3) pteridophyte
(4) gymnosperm

Question no. 160

AAYAM CAREER INSTITUTE

At which stage, the homologous chromosomes separate due to repulsion, but are yet held by chiasmata?

(1) Zygotene
(2) Pachytene
(3) Diplotene
(4) Diakinesis



Question no. 161

AAYAM CAREER INSTITUTE

Which of the following criteria must a molecule fulfil to act as a genetic material?

A. It should not be able to generate its replica.

B. It should chemically and structurally be stable.

C. It should not allow slow mutation.

D. It should be able to express itself in the form of Mendelian Characters.

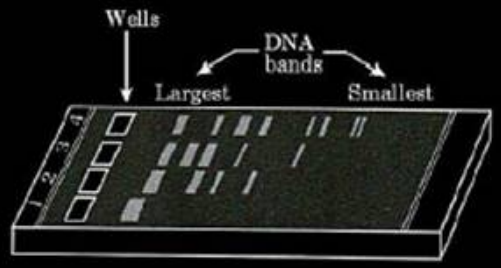
(1) A and B only (2) B and C only

(3) C and D only (4) B and D only

Question no. 162

AAYAM CAREER INSTITUTE

Study the given figure carefully and select the incorrect statements regarding this.



A. It represents a typical agarose gel electrophoresis is which lane 1 contains undigested DNA.

B. The higher the concentration of agarose, the larger will be the pore size.

C. The separated DNA fragments can be visualized after staining in the visible light.

D. The separated DNA bands are cut out from the agarose gel and extracted from the gel piece. This step is known as elution.

E. DNA fragments are negatively charge.

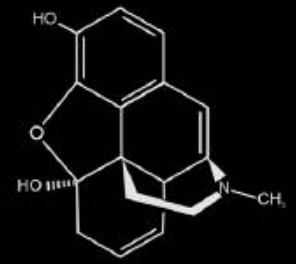
(1) A and B only (2) B and C only

(3) B and E only (4) A and D only

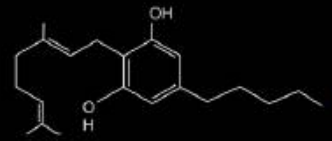
Question no. 163

AAYAM CAREER INSTITUTE

Identify the molecules (A) and (B) shown below and select the right option giving their source and use.

A 

:- Morphine

B 

→ Cannabinoid.

	Molecule	Source	Use
(1)	A. Cocaine	Erythroxylum coca	Accelerates the transport of dopamine
(2)	B. Heroin	Cannabis sativa	"Depressant and slows down body functions.
(3)	B. Cannabinoid	Atropa belladona	Produces hallucinations
(4)	A. Morphine	Papaver somniferum	Sedative and pain killer

(4)

Question no. 164

AAYAM CAREER INSTITUTE

Select the answer which correctly matches the endocrine gland with the hormone it secrets and its function/deficiency symptom:

	Endocrine gland	Hormone	Function/deficiency symptom
(1)	Posterior pituitary	Growth Hormone (GH)	Over secretion stimulates abnormal growth
(2)	Thyroid gland	Thyroxine	Lack of iodine in diet results in goiter
(3)	Corpus luteum	Testosterone	Stimulates spermatogenesis
(4)	Anterior pituitary	Oxytocin	Stimulates uterus contraction during child birth.

Question no. 165

AAYAM CAREER INSTITUTE

Which one of the following is a risk factor for smoking in adolescence?

(1) Higher socioeconomic status

(2) Participation in extracurricular activities, including sports.

(3) Emotional closeness to parents

(4) Physical or sexual abuse

Question no. 166

AAYAM CAREER INSTITUTE

From the statements given below choose the correct option:

A. Benign tumors show the property of metastasis

B. Heroin accelerates body functions.

C. Malignant tumors exhibit metastasis

D. Patients who have undergone surgery are given cannabinoids to relieve pain

E. Spleen is primary lymphoid organ.

(1) A and B only

(2) C, D and E only

(3) C only

(4) A and D only

3

Question no. 167

AAYAM CAREER INSTITUTE

Which system is preferred in Reductionist Biology?

(1) Ecological systems

(2) Behavioral models

(3) Cell–free systems

(4) Whole–organism models

Question no. 168

AAYAM CAREER INSTITUTE

Match List–I with List–II.

	List–I		**List–II**
A.	Ovary	I.	Fruit
B.	Ovule	II.	Guava, orange, mango
C.	Wall of ovary	III.	Pericarp
D.	Fleshy fruits	IV.	Seed

Choose the correct answer from the options given below:

(1) A–I; B–IV; C–III; D–II

(2) A–I; B–II; C–III; D–IV

(3) A–I; B–III; C–II; D–IV

(4) A–III; B–IV; C–I; D–II

Question no. 169

AAYAM CAREER INSTITUTE

Initiation codon of protein synthesis (in eukaryotes) is

(1) GUA

(2) GCA

(3) CCA

(4) AUG

Question no. 170

AAYAM CAREER INSTITUTE

From the statements given below choose the correct option:

A. Haemophilia is a sex–linked recessive disease.

B. Down's syndrome is due to aneuploidy.

C. Phenylketonuria is an autosomal dominant gene disorder.

D. Phenylketonuria is an autosomal recessive gene disorder.

(1) A and C only

(2) A, B and C only

(3) B and C only

(4) A, B and D only

Question no. 171

AAYAM CAREER INSTITUTE

Dissociation curve shifts to the right when

(1) pH increases

(2) CO_2 concentration increases

(3) O_2 concentration decreases

(4) 2, 3 diphosphoglycerate decreases

2

Question no. 172

AAYAM CAREER INSTITUTE

Match List – I with List –II.

	List – I		List – II
A.	Progestasert	i.	Once a week pill
B.	Saheli	ii	Hormone releasing IUD
C.	Lippe's Loop	iii.	Non-medicated IUD
D.	Periodic abstinence	iv.	Natural method of birth control

Choose the correct answer from option given below:

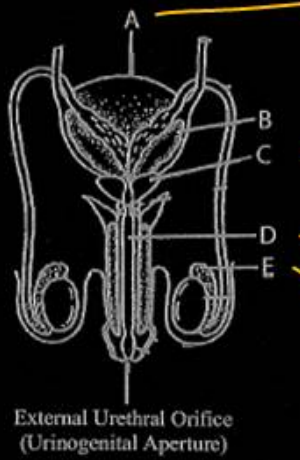
(1) A-ii, B-iii, C-i, D-iv (2) A-i, B-ii, C-iv, D-iii

(3) A-ii, B-i, C-iii, D-iv (4) A-ii, B-iv, C-i, D-iii

Question no. 173

AAYAM CAREER INSTITUTE

Given below is the diagram of a male reproductive system. In which one of the options all the five parts, A, B, C, D and E are correct?



(1) A–Rectum, B–Seminal Vesicle, C–Prostate, D–Urethra, E–Epididymis

(2) A–Urinary bladder, B–Seminal Vesicle, C–Prostate, D–Urethra, E–Epididymis

(3) A–Urinary bladder, B–Prostate, C–Seminal Vesicle, D–Urethra, E–Epididymis

(4) A–Urinary bladder, B–Seminal Vesicle, C–Prostate, D–Epididymis, E–Urethra

Question no. 174

AAYAM CAREER INSTITUTE

A DNA strand with the sequence AACGTAACG is transcribed. What is the sequence of the mRNA molecule synthesised?

(1) AACGTAACG (2) UUGCAUUGC

(3) AACGUAACG (4) TTGCATTGC

DNA → A A C G T A A C G

mRNA → U U G C A U U G C

Question no. 175

AAYAM CAREER INSTITUTE

The unique feature of bryophytes compared to other plant groups is that

(1) They produce spores.

(2) They lack vascular tissues.

(3) They lack roots.

(4) their sporophyte is attached to the gametophyte.

Question no. 176

AAYAM CAREER INSTITUTE

Which of the following is Not a goal of the human genome project?

(1) To sequence the genomes of selected model organisms.

(2) To eliminate all diseases.

(3) To consider social, ethical and legal aspects of genetic information.

(4) To develop computational tools for analyzing sequence information.

Question no. 177

AAYAM CAREER INSTITUTE

Match List – I with List –II.

	List – I		List – II
A.	Stele	i.	Innermost layer of cortex
B.	Endodermis	ii	Suberin
C.	Casparian strips	iii.	Outermost layer
D.	Epiblema/root epidermis	iv.	All the tissues inner to endodermis

Choose the correct answer from option given below:

(1) A-iv, B-i, C-ii, D-iii

(2) A-iii, B-ii, C-i, D-iv

(3) A-i, B-ii, C-iii, D-iv

(4) A-iv, B-ii, C-i, D-iii

Question no. 178

Algin, carrageen and proteins are obtained from

(1) red algae, brown algae, green algae respectively.

(2) brown algae, red algae, green algae respectively.

(3) red algae, green algae, brown algae respectively.

(4) green algae, brown algae, red algae respectively.

Question no. 179

AAYAM CAREER INSTITUTE

Match List – I with List –II.

	List – I		List – II
A.	Family	i.	Tuberosum
B.	Kingdom	ii	Polymoniales
C.	Order	iii.	Plantae
D.	Species	iv	Solanaceae

Choose the correct answer from the option given below:

(1) A-iv, B-ii, C-iii, D-i

(2) A-iv, B-iii, C-ii, D-i

(3) A-iv, B-iii, C-i, D-ii

(4) A-i, B-iii, C-ii, D-iv

Question no. 180

AAYAM CAREER INSTITUTE

Which of the following is considered a hot-spot of biodiversity in India?

(1) Indo-Gangetic Plain

(2) Eastern Ghats

(3) Aravalli Hills

(4) Western Ghats