

**Q.1** In an experiment four quantities a, b, c and d are measured with percentage error 1%, 2%, 3% and 4% respectively. Quantity P is calculated as follows :  $P = \frac{a^3 b^2}{cd}$ . % error in P is -

- (1) 14% (2) 10%  
(3) 7% (4) 4%

**Ans.** [1]

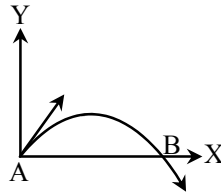
**Sol.** Students find this question in CP Class Notes : [Topic : Errors & Measurement]

$$P = \frac{a^3 b^2}{cd}$$

$$\text{Error in } \left( \frac{\Delta P}{P} \right) = 3 \left( \frac{\Delta a}{a} \right) + 2 \left( \frac{\Delta b}{b} \right) + \left( \frac{\Delta c}{c} \right) + \left( \frac{\Delta d}{d} \right)$$

$$= 3(1\%) + 2(2\%) + 3\% + 4\% = 14\%$$

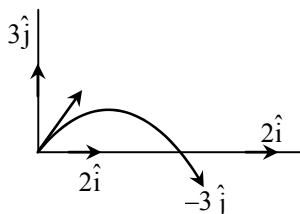
**Q.2** The velocity of a projectile at the initial point A is  $(2\hat{i} + 3\hat{j})$  m/s. It's velocity (in m/s) at point B is -



- (1)  $-2\hat{i} - 3\hat{j}$  (2)  $-2\hat{i} + 3\hat{j}$   
(3)  $2\hat{i} - 3\hat{j}$  (4)  $2\hat{i} + 3\hat{j}$

**Ans.** [3]

**Sol.** Students find this question in CP Class Notes : [Topic : Projectile Motion]



$$\text{So, } v_f = 2\hat{i} - 3\hat{j}$$

**Q.3** A stone falls freely under gravity. It covers distances  $h_1$ ,  $h_2$  and  $h_3$  in the first 5 seconds, the next 5 seconds and the next 5 seconds respectively. The relation between  $h_1$ ,  $h_2$  and  $h_3$  is -

- (1)  $h_1 = 2h_2 = 3h_3$  (2)  $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$   
(3)  $h_2 = 3h_1$  and  $h_3 = 3h_2$  (4)  $h_1 = h_2 = h_3$

Ans. [2]

Sol. Students find similar question in CP Sheet at : Ex. 1, Q.28 (One dimensional motion).

Distance covered in first 5 sec.

$$h_1 = 0 + \frac{1}{2}a(5)^2$$

$$h_1 = \frac{25a}{2} \quad \dots(1)$$

distance covered in first 10 sec

$$S_2 = 0 + \frac{1}{2}a(10)^2 = \frac{100a}{2}$$

So distance covered in second 5 sec.

$$h_2 = S_2 - h_1 = \frac{100a}{2} - \frac{25a}{2} = \frac{75a}{2} \quad \dots(2)$$

distance covered in first 15 sec.

$$S_3 = 0 + \frac{1}{2}a(15)^2 = \frac{225a}{2}$$

so distance covered in last 5 sec.

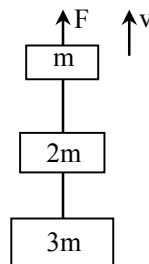
$$h_3 = S_3 - S_2 = \frac{225a}{2} - \frac{100a}{2} = \frac{125a}{2} \quad \dots(3)$$

using (1), (2) and (3) equation.

$$\frac{h_1}{25a} = \frac{h_2}{75a} = \frac{h_3}{125a}$$

$$h_1 = \frac{h_2}{3} = \frac{h_3}{5}$$

Q.4 Three blocks with masses  $m$ ,  $2m$  and  $3m$  are connected by strings, as shown in the figure. After an upward force  $F$  is applied on block  $m$ , the masses move upward at constant speed  $v$ . What is the net force on the block of mass  $2m$ ? ( $g$  is the acceleration due to gravity)



(1) zero

(2)  $2mg$

(3)  $3mg$

(4)  $6mg$

Ans. [1]

Sol. Students find similar question in CP Sheet at : Ex. 1, Q.53 (Newton's Laws of motion).

Blocks are moving with constant speed so net force on each block will be zero.

Here  $F = ma$        $a = 0$

So  $F = 0$

**Q.5** The upper half of an inclined plane of inclination  $\theta$  is perfectly smooth while lower half is rough. A block starting from rest at the top of the plane will again come to rest at the bottom, if the coefficient of friction between the block and lower half of the plane is given by -

$$(1) \mu = \frac{1}{\tan \theta}$$

$$(2) \mu = \frac{2}{\tan \theta}$$

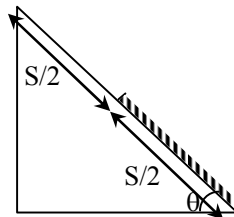
$$(3) \mu = 2 \tan \theta$$

$$(4) \mu = \tan \theta$$

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : similar Q.8, Ex. 3B, Page. 56 (Laws of motion)

Gain of kinetic energy = loss of KE due to friction in lower half.



$$mg \sin \theta S = \mu mg \cos \theta S/2$$

$$\mu = 2 \tan \theta$$

**Q.6** A uniform force of  $(3\hat{i} + \hat{j})$  newton acts on a particle of mass 2 kg. Hence the particle is displaced from position  $(2\hat{i} + \hat{k})$  meter to position  $(4\hat{i} + 3\hat{j} - \hat{k})$  meter. The work done by the force on the particle is -

$$(1) 9 \text{ J}$$

$$(2) 6 \text{ J}$$

$$(3) 13 \text{ J}$$

$$(4) 15 \text{ J}$$

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : similar Q.4, Ex. 1, Page. 90 (Work, Power & Energy)

$$\text{Displacement} = \vec{r}_2 - \vec{r}_1 = (4\hat{i} + 3\hat{j} - \hat{k}) - (2\hat{i} + \hat{k})$$

$$= 2\hat{i} + 3\hat{j} - 2\hat{k}$$

$$\text{Force } \vec{F} = 3\hat{i} + \hat{j}$$

$$\text{Work } W = \vec{F} \cdot \vec{d} = (3\hat{i} + \hat{j}) \cdot (2\hat{i} + 3\hat{j} - 2\hat{k})$$

$$= 6 + 3 = 9 \text{ J}$$

**Q.7** An explosion breaks a rock into three parts in a horizontal plane. Two of them go off at right angles to each other. The first part of mass 1 kg moves with a speed of  $12 \text{ ms}^{-1}$  and the second part of mass 2 kg moves with  $8 \text{ ms}^{-1}$  speed. If the third part flies off with  $4 \text{ ms}^{-1}$  speed, then its mass is -

$$(1) 3 \text{ kg}$$

$$(2) 5 \text{ kg}$$

$$(3) 7 \text{ kg}$$

$$(4) 17 \text{ kg}$$

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : similar Q.31, Ex. 3A, Page. 101 (Work, Power & Energy)

Using law of conservation of linear momentum

$$\vec{P}_1 + \vec{P}_2 + \vec{P}_3 = 0$$

$$m_1 \vec{v}_1 + m_2 \vec{v}_2 + m_3 \vec{v}_3 = 0$$

$$|m_3 \vec{v}_3| = |-(m_1 \vec{v}_1 + m_2 \vec{v}_2)| \quad \vec{v}_1 \perp \vec{v}_2$$

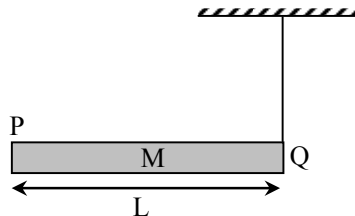
$$m_3 v_3 = \sqrt{m_1^2 v_1^2 + m_2^2 v_2^2}$$

$$m_3 \cdot 4 = \sqrt{1^2 \times 12^2 + 2^2 \times 8^2}$$

$$m_3 \cdot 4 = 20$$

$$m_3 = \frac{20}{4} = 5 \text{ kg}$$

- Q.8** A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is -

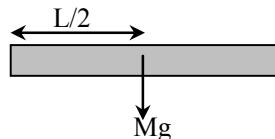


- (1)  $\frac{3g}{2L}$                       (2)  $\frac{g}{L}$                       (3)  $\frac{2g}{L}$                       (4)  $\frac{2g}{3L}$

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : similar Q.24, Ex. 3A, Page. 160 (Rotational Motion)

$$\tau = I\alpha$$



$$\frac{L}{2} Mg = \frac{ML^2}{3} \alpha$$

$$\alpha = \frac{3g}{2L}$$

- Q.9** A small object of uniform density rolls up a curved surface with an initially velocity 'v'. It reaches upto a maximum height of  $\frac{3v^2}{4g}$  with respect to the initial position. The object is -

- (1) Ring    (2) Solid sphere  
(3) Hollow sphere                                      (4) Disc

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : similar Q.32, Ex. 2, Page. 154 (Rotational motion)  
Using mechanical energy conservation

$$\frac{1}{2}mv^2\left(1 + \frac{k^2}{R^2}\right) = mg\left(\frac{3v^2}{4g}\right)$$

$$1 + \frac{k^2}{R^2} = \frac{3}{2}$$

$$\frac{k^2}{R^2} = \frac{1}{2}$$

So, body is disc or solid cylinder.

**Q.10** A body of mass 'm' is taken from the earth's surface to the height equal to twice the radius (R) of the earth. The change in potential energy of body will be -

- (1)  $mg \ 2R$  (2)  $\frac{2}{3} mgR$   
(3)  $3 mgR$  (4)  $\frac{1}{3} mgR$

**Ans.** [2]

**Sol.** Students find similar question in CP Sheet at : Ex. 2A, Q.9 (Gravitation).

$$\Delta U = \frac{mgh}{1 + \frac{h}{R}} = \frac{mg2R}{1+2} = \frac{2}{3}mgR$$

$$h = 2R$$

**Q.11** Infinite number of bodies, each of mass 2 kg are situated on x-axis at distances 1m, 2m, 4m, 8m, ... , respectively, from the origin. The resulting gravitational potential due to this system at the origin will be -

- (1)  $-G$  (2)  $-\frac{8}{3}G$  (3)  $-\frac{4}{3}G$  (4)  $-4G$

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : [Topic : Gravitation]

$$\begin{array}{ccccccccc} & 2\text{kg} & 2\text{kg} & 2\text{kg} & 2\text{kg} & & & & \\ \bullet & \bullet & \bullet & \bullet & \bullet & & & & \\ x = 0 & 1\text{m} & 2\text{m} & 4\text{m} & 8\text{m} & \dots & \dots & \dots & \dots \end{array}$$

$$V_g = -\frac{G(2)}{1} - \frac{G(2)}{2} - \frac{G(2)}{4} - \frac{G(2)}{8} - \dots - \infty$$

$$V_g = -2G \left[ 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots \infty \right]$$

$$= -2G \left[ \frac{1}{1 - \frac{1}{2}} \right] = -2G(2) = -4G$$

**Q.12** The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied ?

- (1) length = 50 cm, diameter = 0.5 mm                      (2) length = 100 cm, diameter = 1 mm  
 (3) length = 200 cm, diameter = 2 mm                      (4) length = 300 cm, diameter = 3 mm

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : similar Q.9, CP Study material Sheet (Elasticity)

$$Y = \frac{MgL}{\Delta L.A}$$

$$\Delta L = \frac{mgL}{Y.A}$$

$$\Delta L \propto \frac{L}{A}$$

**Q.13** The wettability of a surface by a liquid depends primarily on -

- (1) viscosity  
 (2) surface tension  
 (3) density  
 (4) angle of contact between the surface and the liquid

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Page no. 195, Theory Notes CP Study material (Surface Tension)

The wettability of a surface by a liquid depends on angle of contact between the surface and the liquid.

**Q.14** The molar specific heats of an ideal gas at constant pressure and volume are denoted by  $C_p$  and  $C_v$ , respectively. If  $\gamma = \frac{C_p}{C_v}$  and  $R$  is the universal gas constant, then  $C_v$  is equal to -

- (1)  $\frac{1+\gamma}{1-\gamma}$                       (2)  $\frac{R}{(\gamma-1)}$                       (3)  $\frac{(\gamma-1)}{R}$                       (4)  $\gamma R$

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : similar Q.9, Ex. 3A (Calorimetry)

$$C_p - C_v = R$$

$$\Rightarrow \frac{C_p}{C_v} - \frac{C_v}{C_v} = \frac{R}{C_v}$$

$$\gamma - 1 = \frac{R}{C_v}$$

$$\therefore C_v = \frac{R}{\gamma-1}$$

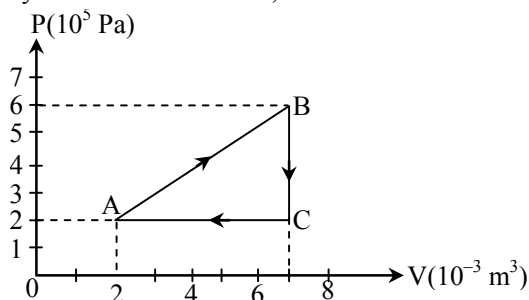
- Q.15** A piece of iron is heated in a flame. It first becomes dull red then becomes reddish yellow and finally turns to white hot. The correct explanation for the above observation is possible by using -
- (1) Stefan's law (2) Wien's displacement law  
(3) Kirchoff's law (4) Newton's law of cooling

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : [Topic : Radiation]

We know Wien's displacement law  $\lambda_m \propto \frac{1}{T}$

- Q.16** A gas is taken through the cycle  $A \rightarrow B \rightarrow C \rightarrow A$ , as shown. What is the net work done by the gas ?



- (1) 2000 J (2) 1000 J  
(3) zero (4) -2000 J

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : [Topic : Thermodynamics]

We know work done

= Area under P-V curve.

$$= \frac{1}{2} \times 4 \times 10^5 \times 5 \times 10^{-3}$$

$$= 10 \times 10^5 \times 10^{-3} = 1000 \text{ J}$$

- Q.17** During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its temperature.

The ratio of  $\frac{C_p}{C_v}$  for the gas is -

- (1)  $\frac{4}{3}$  (2) 2 (3)  $\frac{5}{3}$  (4)  $\frac{3}{2}$

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : similar Q.25, Ex. 3A, Page. 172 (Thermodynamic)

In adiabatic process

$$P \propto T^{\gamma/\gamma-1}$$

$$\text{and } P \propto T^3$$

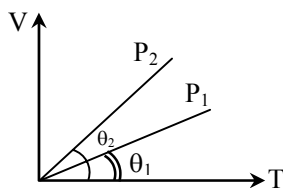
$$\frac{\gamma}{\gamma-1} = 3$$

$$\therefore \gamma = 3\gamma - 3$$

$$-2\gamma = -3$$

$$\gamma = 3/2$$

**Q.18** In the given (V – T) diagram, what is the relation between pressures  $P_1$  and  $P_2$  ?



- (1)  $P_2 = P_1$  (2)  $P_2 > P_1$   
 (3)  $P_2 < P_1$  (4) cannot be predicted

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : similar Q.32, Ex. 2, Page. 133 (K.T.G)

Ideal gas equation

$$PV = nRT$$

and  $\frac{V}{T} \propto \frac{1}{P}$  by equation

and by graph  $\frac{V}{T} = \tan \theta$

$$\therefore \frac{1}{P} \propto \tan \theta$$

$\theta \uparrow, \tan \theta \uparrow, P \downarrow$

$$\therefore P_1 > P_2$$

**Q.19** The amount of heat energy required to raise the temperature of 1 g of Helium at NTP, from  $T_1$  K to  $T_2$  K is -

- (1)  $\frac{3}{8} N_A k_B (T_2 - T_1)$  (2)  $\frac{3}{2} N_A k_B (T_2 - T_1)$   
 (3)  $\frac{3}{4} N_A k_B (T_2 - T_1)$  (4)  $\frac{3}{4} N_A k_B \left( \frac{T_2}{T_1} \right)$

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : [Topic : KTG]

$$E = \frac{f}{2} nRT \text{ OR}$$

$$= \frac{f}{2} NkT$$

$$\therefore N = n \cdot N_A$$

$$= \frac{3}{2} \cdot n \cdot N_A \cdot k_B \cdot T$$

$$= \frac{3}{8} N_A \cdot k_B \cdot T$$

$$n = \frac{m}{M} = \frac{1}{4}$$

where  $N_A$  = Avagadro's number

$k_B$  = Boltzmann const.



**Q.20** A wave travelling in the +ve x-direction having displacement along y-direction as 1m, wavelength  $2\pi$ m and frequency of  $\frac{1}{\pi}$  Hz is represented by -

(1)  $y = \sin(x - 2t)$

(2)  $y = \sin(2\pi x - 2\pi t)$

(3)  $y = \sin(10\pi x - 20\pi t)$

(4)  $y = \sin(2\pi x + 2\pi t)$

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : similar Q.29, Ex. 3A, Page. 54 (Waves)

$$y = a \sin(\omega t - kx)$$

OR

$$y = a \sin(kx - \omega t)$$

$$\therefore y = \sin[x - 2t] \quad \dots(1)$$

$$k = \frac{2\pi}{\lambda} = \frac{2\pi}{2\pi}$$

$$\omega = 2\pi \cdot v = 2\pi \cdot \frac{1}{\pi} = 2$$

$$a = 1\text{m}$$

**Q.21** If we study the vibration of a pipe open at both ends, then the following statement is not true -

(1) Open end will be antinode

(2) Odd harmonics of the fundamental frequency will be generated

(3) All harmonics of the fundamental frequency will be generated

(4) Pressure change will be maximum at both ends

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : [Topic : Waves]

When pipe is open at both ends then ratio of frequency

$$(i) v : 2v : 3v : 4v : 5v$$

$$\text{where } v = \frac{v}{2L}$$

odd and even both harmonics will present

So, option (1), (2) and (3) are correct.

$\therefore$  pressure variation is minimum at antinode

$\therefore$  (4) is wrong option.

**Q.22** A source of unknown frequency gives 4 beats/s, when sounded with a source of known frequency 250 Hz. The second harmonic of the source of unknown frequency gives five beats per second, when sounded with a source of frequency 513 Hz. The unknown frequency is -

(1) 254 Hz

(2) 246 Hz

(3) 240 Hz

(4) 260 Hz

Ans. [1]

Sol. Students may find this question in CP Sheet at : similar Q.26, Ex. 2, Page. 50 (Waves)

$$v' = 250 \pm 4 = 254 \text{ OR } 246$$

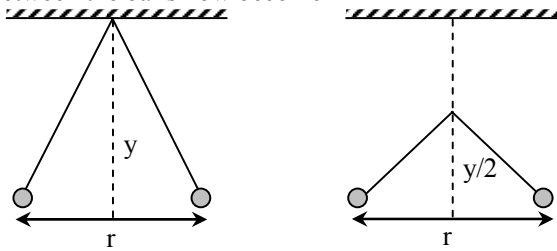
$$v'' = 2 \cdot v' \text{ and } v'' = 513 \pm 5 = 518 \text{ OR } 508$$

$$\text{So, } 508 = 2 \cdot (254)$$

$$\text{OR } v'' = 2 \cdot (v')$$

Answer is (254 Hz).

**Q.23** Two pith balls carrying equal charges are suspended from a common point by strings of equal length, the equilibrium separation between them is  $r$ . Now the strings are rigidly clamped at half the height. The equilibrium separation between the balls now become -



(1)  $\left(\frac{1}{\sqrt{2}}\right)^2$

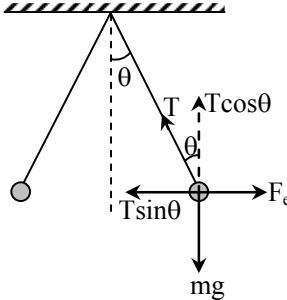
(2)  $\left(\frac{r}{\sqrt[3]{2}}\right)$

(3)  $\left(\frac{2r}{\sqrt{3}}\right)$

(4)  $\left(\frac{2r}{3}\right)$

Ans. [2]

Sol. Students may find this question in CP Sheet at : Similar to Ex.2, Q.13. (Electrostatics)



At balance

$$T \cos \theta = mg$$

$$T \sin \theta = F_e = \frac{Kq^2}{r^2}$$

$$\tan \theta = \frac{Kq^2}{r^2 mg} = \frac{r/2}{y}$$

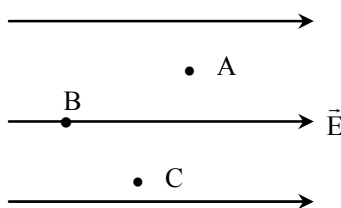
$$y = \frac{mgr^3}{2kq^2} \quad \dots(1)$$

$$y \propto r^3$$

$$r \propto y^{1/3}$$

$$r' \propto (y/2)^{1/3} \propto \frac{r}{2^{1/3}}$$

**Q.24** A, B and C are three points in a uniform electric field. The electric potential is -



- (1) maximum at A  
 (2) maximum at B  
 (3) maximum at C  
 (4) same at all the three points A, B and C

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Q.64, Ex 3B (Electrostatics).

Electric field is from high potential to low potential.

So, potential is maximum at B.

**Q.25** A wire of resistance  $4\Omega$  is stretched to twice its original length. The resistance of stretched wire would be -

- (1)  $2\Omega$                       (2)  $4\Omega$                       (3)  $8\Omega$                       (4)  $16\Omega$

**Ans.** [4]

**Sol.** Students may find similar question in CP Sheet at : Q.7, Ex. 2 (Electrostatics).

At constant volume

$$R \propto \ell^2$$

$$\Rightarrow R' = 4R = 16\Omega$$

**Q.26** The internal resistance of a 2.1 V cell which gives a current of 0.2A through a resistance of  $10\Omega$  is -

- (1)  $0.2\Omega$                       (2)  $0.5\Omega$                       (3)  $0.8\Omega$                       (4)  $1.0\Omega$

**Ans.** [2]

**Sol.** Students may find this question in CP Class Notes : [Topic : Current Electricity]

$$I = \frac{E}{R + r}$$

$$0.2 = \frac{2.1}{10 + r}$$

$$2 + 0.2r = 2.1$$

$$0.2r = 2.1$$

$$r = 0.5\Omega$$

**Q.27** The resistances of the four arms P, Q, R and S in a Wheatstone's bridge are 10 ohm, 30 ohm, 30 ohm and 90 ohm, respectively. The e.m.f. and internal resistance of the cell are 7 volt and 5 ohm respectively. If the galvanometer resistance is 50 ohm, the current drawn from the cell will be -

- (1) 1.0 A                      (2) 0.2 A                      (3) 0.1 A                      (4) 2.0 A

**Ans.** [2]

**Sol.** Students may find similar question in CP Sheet at : Q.22, Ex.3(A) (Current Electricity).

$$\therefore \frac{P}{Q} = \frac{P}{S} \Rightarrow \text{Balanced bridge}$$

Equivalent resistance of bridge

$$= \frac{40 \times 120}{40 + 120} = 30 \Omega$$

$$\therefore I_{\text{battery}} = \frac{7}{30 + 5} = 0.2 \text{ A}$$

**Q.28** When a proton is released from rest in a room, it starts with an initial acceleration  $a_0$  towards west. When it is projected towards north with a speed  $v_0$  it moves with an initial acceleration  $3a_0$  toward west. The electric and magnetic fields in the room are -

- (1)  $\frac{ma_0}{e}$  west,  $\frac{2ma_0}{ev_0}$  up
- (2)  $\frac{ma_0}{e}$  west,  $\frac{2ma_0}{ev_0}$  down
- (3)  $\frac{ma_0}{e}$  east,  $\frac{3ma_0}{ev_0}$  up
- (4)  $\frac{ma_0}{e}$  east,  $\frac{3ma_0}{ev_0}$  down

**Ans.** [2]

**Sol.** Discussed in CP Class Notes : [Topic : Magnetic Effect of Current]

$$\vec{F}_L = \vec{F}_e + \vec{F}_m = q \vec{E} + q (\vec{v} \times \vec{B})$$

$$ma_0 = qE + 0 \quad \dots(1)$$

$$E = \frac{ma_0}{q} \text{ so } \vec{E} = \frac{ma_0}{e} \text{ in west}$$

$$\vec{F}_L = \vec{F}_e + \vec{F}_m$$

$$3 ma_0 = qE + q (\vec{v} \times \vec{B}) \Rightarrow q (\vec{v} \times \vec{B}) = 2 ma_0 \text{ (west)}$$

$$\vec{F}_m = q \vec{v} \times \vec{B}$$

$$-\hat{i} = (+\hat{j}) \times \dots\dots\dots$$

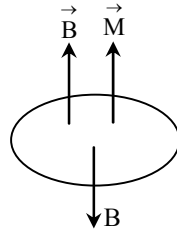
$$B = \frac{2ma_0}{qv} \text{ in vertically downward}$$

**Q.29** A current loop in a magnetic field -

- (1) experiences a torque whether the field is uniform or non-uniform in all orientations
- (2) can be in equilibrium in one orientation
- (3) can be in equilibrium in two orientations, both the equilibrium states are unstable
- (4) can be in equilibrium in two orientations, one stable while the other is unstable

**Ans.** [4]

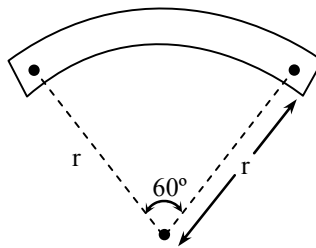
Sol. Students find this question in CP Class notes : [Topic : Magnetism]



$\theta = 0^\circ$  stable equilibrium

$\theta = 180^\circ$  unstable equilibrium

**Q.30** A bar magnet of length ' $l$ ' and magnetic dipole moment ' $M$ ' is bent in the form of an arc as shown in figure. The new magnetic dipole moment will be –



(1)  $M$

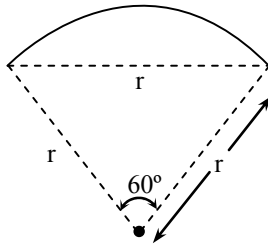
(2)  $\frac{3}{\pi} M$

(3)  $\frac{2}{\pi} M$

(4)  $\frac{M}{2}$

Ans. [2]

Sol. Students find this question in CP Sheet : Q.10, Ex. 3(B) (Magnetic field).



$$l = \frac{\pi}{3} r$$

$$r = \frac{3l}{\pi}$$

$$M' = m(r) = m \left( \frac{3l}{\pi} \right) = \frac{3M}{\pi}$$

**Q.31** A wire loop is rotated in a magnetic field. The frequency of change of direction of the induced e.m.f. is -

(1) once per revolution

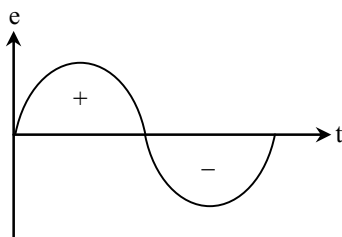
(2) twice per revolution

(3) four times per revolution

(4) six times per revolution

Ans. [2]

Sol. Students find this question in CP Sheet at : Q.15, Ex. 1 (Alternating Current)



$$e = N\omega AB \sin \omega t$$

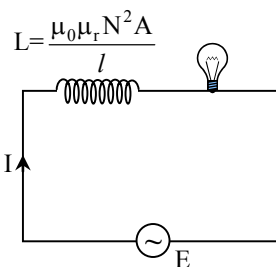
direction of e.m.f. changed two times

**Q.32** A coil of self-inductance  $L$  is connected in series with a bulb  $B$  and an AC source. Brightness of the bulb decreases when -

- (1) frequency of the AC source is decreased
- (2) number of turns in the coil is reduced
- (3) a capacitance of reactance  $X_C = X_L$  is included in the same circuit
- (4) an iron rod is inserted in the coil

**Ans.** [4]

**Sol.** Students find this question in CP Class notes : [Topic : Alternating Current]



$$\downarrow I = \frac{E}{\sqrt{\omega^2 L^2 + R^2}} = \frac{E}{\sqrt{\omega^2 L^2 \uparrow + R^2}}$$

$$L \propto \mu_r$$

$L$  is increased when iron rod inserted

So current decreased

**Q.33** The condition under which a microwave oven heats up a food item containing water molecules most efficiently is -

- (1) The frequency of the microwaves must match the resonant frequency of water molecules
- (2) The frequency of the microwaves has no relation with natural frequency of water molecules
- (3) Microwaves are heat waves, so always produce heating
- (4) Infra-red waves produce heating in a microwave oven

**Ans.** [1]

**Sol.** Students find this question in CP Class notes.

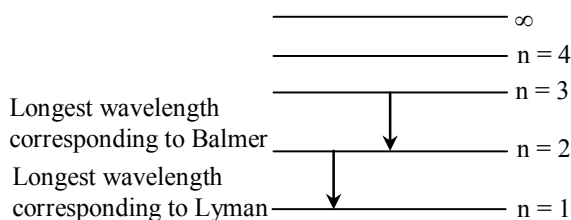
In the presence of microwave water molecules oscillates the frequency of microwave and large heat is developed.

**Q.34** Ratio of longest wave lengths corresponding to Lyman and Balmer series in hydrogen spectrum is -

- (1)  $\frac{5}{27}$                       (2)  $\frac{3}{23}$                       (3)  $\frac{7}{29}$                       (4)  $\frac{9}{31}$

**Ans.** [1]

**Sol.** Students find this question in CP Class notes : [Topic : Atomic Structure]



$$\frac{1}{\lambda_{\ell}} = R(1)^2 \left[ \frac{1}{1^2} - \frac{1}{2^2} \right] = \frac{3R}{4}$$

$$\lambda_{\ell} = \frac{4}{3R} \quad \dots(1)$$

$$\frac{1}{\lambda_b} = R(1)^2 \left[ \frac{1}{2^2} - \frac{1}{3^2} \right] = \frac{5R}{36}$$

$$\lambda_b = \frac{36}{5R} \quad \dots(2)$$

$$\frac{\lambda_{\ell}}{\lambda_b} = \frac{4}{3R} \times \frac{5R}{36} = \frac{5}{3 \times 9} = \frac{5}{27}$$

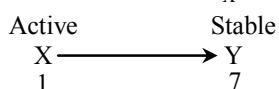
**Q.35** The half-life of a radioactive isotope 'X' is 20 years. It decays to another element 'Y' which is stable. The two elements 'X' and 'Y' were found to be in the ratio 1 : 7 in a sample of a given rock. The age of the rock is estimated to be -

- (1) 40 years                      (2) 60 years                      (3) 80 years                      (4) 100 years

**Ans.** [2]

**Sol.** Students may find similar question in CP Sheet at : Page no. 45, Q.9 (Radioactivity)

Half-life of X  $\Rightarrow T_X = 20$  years



$$\frac{N}{N_0} = \frac{1}{1+7} = \frac{1}{8} = \frac{1}{2^n} = \frac{1}{2^3}$$

$$n = 3 = \frac{t}{T} = \frac{t}{20}$$

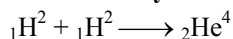
$$t = 60 \text{ years}$$

**Q.36** A certain mass of Hydrogen is changed to Helium by the process of fusion. The mass defect in fusion reaction is 0.02866 u. The energy liberated per u is - (Given 1 u = 931 MeV)

- (1) 2.67 MeV                      (2) 26.7 MeV                      (3) 6.675 MeV                      (4) 13.35 MeV

**Ans.** [3]

**Sol.** Students may find similar question in CP Class notes : [Topic : Nuclear Physics]



$$\text{Mass defect} = \Delta m = 0.02866 \text{ u}$$

$$\begin{aligned} \text{Total energy} = E = \Delta mc^2 &= 0.02866 \times 931 \text{ MeV} \\ &= 26.68 \text{ MeV} \end{aligned}$$

$$\text{Energy liberated per u} = \frac{E}{A} = \frac{26.68}{4} = 6.678 \text{ MeV}$$

**Q.37** For photoelectric emission from certain metal the cutoff frequency is  $\nu$ . If radiation of frequency  $2\nu$  impinges on the metal plate, the maximum possible velocity of the emitted electron will be ( $m$  is the electron mass) -

- (1)  $\sqrt{h\nu/(2m)}$                       (2)  $\sqrt{h\nu/m}$                       (3)  $\sqrt{2h\nu/m}$                       (4)  $2\sqrt{h\nu/m}$

**Ans.** [3]

**Sol.** Students may find this question in CP Class notes : [Topic : Photoelectric Effect]

$$\text{Cutoff frequency} = \nu$$

$$\text{Work function} = \phi = h\nu$$

$$\text{Use, } E = \text{K.E.} + \phi$$

$$2 h\nu = \frac{1}{2} mv^2 + h\nu$$

$$\frac{1}{2} mv^2 = 2 h\nu - h\nu = h\nu$$

$$v = \sqrt{\frac{2h\nu}{m}}$$

**Q.38** The wavelength  $\lambda_e$  of an electron and  $\lambda_p$  of a photon of same energy  $E$  are related by -

- (1)  $\lambda_p \propto \lambda_e^2$                       (2)  $\lambda_p \propto \lambda_e$                       (3)  $\lambda_p \propto \sqrt{\lambda_e}$                       (4)  $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$

**Ans.** [1]

**Sol.** Students may find similar question in CP Sheet at : Page no. 103, Q.21 (Matter Waves)

de-Broglie wavelength for an electron

$$\lambda_e = \frac{h}{\sqrt{2mE}} \quad \text{or } \lambda_e \propto \frac{1}{\sqrt{E}}$$

$$\text{or } \lambda_e^2 \propto \frac{1}{E} \quad \dots(1)$$

$$\text{Wavelength of photon} \Rightarrow \lambda_p = \frac{hc}{E}$$

$$\text{or } \lambda_p \propto \frac{1}{E} \quad \dots(2)$$

From equation (1) and (2)

$$\lambda_e^2 \propto \lambda_p$$

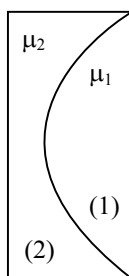


**Q.39** A plano convex lens fits exactly into a plano concave lens. Their plane surfaces are parallel to each other. If lenses are made of different materials of refractive indices  $\mu_1$  and  $\mu_2$  and  $R$  is the radius of curvature of the curved surface of the lenses, then the focal length of the combination is -

- (1)  $\frac{R}{2(\mu_1 + \mu_2)}$       (2)  $\frac{R}{2(\mu_1 - \mu_2)}$       (3)  $\frac{R}{(\mu_1 - \mu_2)}$       (4)  $\frac{2R}{(\mu_2 - \mu_1)}$

**Ans.** [3]

**Sol.** Students find this question in CP Class notes : [Topic : Ray Optics]



$$\text{Focal length of first lens } \frac{1}{f_1} = (\mu_1 - 1) \left( \frac{1}{\infty} - \frac{1}{-R} \right) = \frac{\mu_1 - 1}{R}$$

$$\text{Focal length of second lens } \frac{1}{f_2} = (\mu_2 - 1) \left( \frac{1}{-R} - \frac{1}{\infty} \right) = -\frac{(\mu_2 - 1)}{R}$$

So focal length of the combination

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} = \frac{\mu_1 - 1}{R} - \frac{(\mu_2 - 1)}{R}$$

$$\frac{1}{f} = \frac{\mu_1 - \mu_2}{R}$$

$$f = \frac{R}{\mu_1 - \mu_2}$$

**Q.40** For a normal eye, the cornea of eye provides a converging power of 40D and the least converging power of the eye lens behind the cornea is 20D. Using this information, the distance between the retina and the cornea-eye lens can be estimated to be -

- (1) 5 cm      (2) 2.5 cm      (3) 1.67 cm      (4) 1.5 cm

**Ans.** [3]

**Sol.** Students find this question in NCERT and in CP Class notes : [Topic : Ray Optics]

(lens + cornea) should form image of distance object at retina

Converging power  $(40 + 20) \text{ D} = 60 \text{ D}$

Using lens equation

$$\frac{1}{v} - \frac{1}{\infty} = \frac{60}{100}$$

$$v = \frac{5}{3} \text{ cm} = 1.67 \text{ cm}$$

So distance between retina and cornea should be 1.67 cm.

**Q.41** In Young's double slit experiment, the slits are 2mm apart and are illuminated by photons of two wavelengths  $\lambda_1 = 12000 \text{ \AA}$  and  $\lambda_2 = 10000 \text{ \AA}$ . At what minimum distance from the common central bright fringe on the screen 2m from the slit will a bright fringe from one interference pattern coincide with a bright fringe from the other ?

- (1) 8 mm                      (2) 6 mm                      (3) 4 mm                      (4) 3 mm

**Ans.** [2]

**Sol.** Students find this question in CP Class notes : [Topic : Wave Optics]

$$d = 2 \text{ mm} ; \quad D = 2 \text{ m}$$

Fringe width for first wave length 12000  $\text{\AA}$

$$\beta_1 = \frac{\lambda_1 D}{d} = \frac{12000 \times 10^{-10} \times 2}{2 \times 10^{-3}} = 1.2 \times 10^{-3} \text{ m} = 1.2 \text{ mm}$$

For second wave length

$$\beta_2 = \frac{\lambda_2 D}{d} = \frac{10000 \times 10^{-10} \times 2}{2 \times 10^{-3}} = 1 \text{ mm}$$

At 6 mm distance from center bright fringe 5<sup>th</sup> fringe of first coincides with 6<sup>th</sup> of second.

**Q.42** A parallel beam of fast moving electrons is incident normally on a narrow slit. A fluorescent screen is placed at a large distance from the slit. If the speed of the electrons is increased, which of the following statements is correct ?

- (1) Diffraction pattern is not observed on the screen in the case of electrons  
 (2) The angular width of the central maximum of the diffraction pattern will increase  
 (3) The angular width of the central maximum will decrease  
 (4) The angular width of the central maximum will be unaffected

**Ans.** [3]

**Sol.** Students may find this question in CP Class notes : [Topic : Wave Optics]

As speed of an electron increases.

Its de-Broglie wavelength decreases

$$\left\{ \lambda = \frac{h}{mv} \right\}$$

and angular width for central maxima is  $\omega = \frac{2\lambda}{d}$

$$\omega \propto \lambda \propto \frac{1}{v}$$

**Q.43** In a n-type semiconductor, which of the following statements is true -

- (1) Electrons are majority carriers and trivalent atoms are dopants  
 (2) Electrons are minority carriers and pentavalent atoms are dopants  
 (3) Holes are minority carriers and pentavalent atoms are dopants  
 (4) Holes are majority carriers and trivalent atoms are dopants

Ans. [3]

Sol. Students may find similar question in CP Sheet at : Page no. 198, Q.53, Ex. 3(A) (Electronics)

In n-type – Minority are hole and dopant are pentavalent.

Q.44 In a common emitter (CE) amplifier having a voltage gain  $G$ , the transistor used has transconductance  $0.03 \text{ mho}$  and current gain  $25$ . If the above transistor is replaced with another one with transconductance  $0.02 \text{ mho}$  and current gain  $20$ , the voltage gain will be -

- (1)  $\frac{2}{3} G$                       (2)  $1.5G$                       (3)  $\frac{1}{3} G$                       (4)  $\frac{5}{4} G$

Ans. [1]

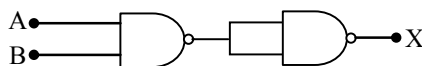
Sol. Students may find this question in CP Class notes : [Topic : Electronics]

$$\text{Voltage gain} = \frac{V_o}{V_i} = \frac{I_o R_o}{V_i} = g_m R_o$$

$$A \propto g_m$$

$$\frac{G}{G'} = \frac{g_{m1}}{g_{m2}} \Rightarrow G' = \frac{2}{3} G$$

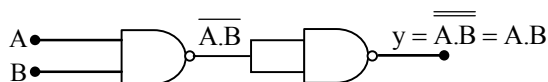
Q.45 The output ( $X$ ) of the logic circuit shown in figure will be -



- (1)  $X = \overline{\overline{A} \cdot \overline{B}}$                       (2)  $X = \overline{A \cdot B}$                       (3)  $X = A \cdot B$                       (4)  $X = \overline{A + B}$

Ans. [3]

Sol. Students may find similar question in CP Sheet at : Page no. 195, Q.16 (Electronics)



NAND + NOT = AND

Q.46 The value of Planck's constant is  $6.63 \times 10^{-34} \text{ Js}$ . The speed of light is  $3 \times 10^{17} \text{ nm s}^{-1}$ . Which value is closest to the wavelength in nanometer of a quantum of light with frequency of  $6 \times 10^{15} \text{ s}^{-1}$  ?

- (1) 10                      (2) 25                      (3) 50                      (4) 75

Ans. [3]

Sol. Students may find this question in CP Sheet at : Atomic structure- same as to Page 33, Ex.-3(A) Q.27.

$$h = 6.63 \times 10^{-34} \text{ Js.}$$

$$C = 3 \times 10^{17} \text{ nm/sec.}$$

$$\lambda = 6 \times 10^{15} \text{ sec}^{-1}$$

$$\lambda = \frac{C}{\nu} = \frac{3 \times 10^{17}}{6 \times 10^{15}} = 50 \text{ nm}$$

Q.47 What is the maximum numbers of electrons that can be associated with the following set of quantum numbers ?

$$n = 3, \ell = 1 \text{ and } m = -1.$$

- (1) 10                      (2) 6                      (3) 4                      (4) 2

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Atomic structure- similar to Page 22, Ex.-1 Q.42.

$$n = 3 \quad \ell = 1 \quad m = -1$$

$$3p_x \text{ or } 3p_y \quad \text{no of } e^{-1} = 2$$

**Q.48** What is the activation energy for a reaction if its rate doubles when the temperature is raised from 20°C to 35°C ? ( $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$ )

- (1) 342 kJ mol<sup>-1</sup>                      (2) 269 kJ mol<sup>-1</sup>                      (3) 34.7 kJ mol<sup>-1</sup>                      (4) 15.1 kJ mol<sup>-1</sup>

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Chemical kinetics- similar to Page 186, Ex.-1 Q.93.

$$\log \frac{k_2}{k_1} = \frac{E_a}{2.303 \times R} \left( \frac{1}{293} - \frac{1}{308} \right)$$

$$\log 2 = \frac{E_a}{2.303R} \left( \frac{308 - 293}{293 \times 308} \right)$$

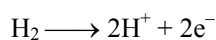
$$E_a = 34673 \text{ J} = 34.67 \text{ kJ}$$

**Q.49** A hydrogen gas electrode is made by dipping platinum wire in a solution of HCl of pH = 10 and by passing hydrogen gas around the platinum wire at one atm pressure. The oxidation potential of electrode would be ?

- (1) 0.059 V                      (2) 0.59 V                      (3) 0.118 V                      (4) 1.18 V

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Electrochemistry- similar to Page 26, Ex.-2 Q.19.



$$E_{\text{oxi}} = E^{\circ}_{\text{oxi}} - \frac{0.059}{2} \log \frac{[\text{H}^+]^2}{P_{\text{H}_2}}$$

$$= 0 - \frac{0.059}{2} \log \frac{[10^{-10}]^2}{1}$$

$$= - \frac{0.059}{2} \times (-20)$$

$$= 0.59 \text{ V}$$

**Q.50** A reaction having equal energies of activation for forward and reverse reactions has -

- (1)  $\Delta S = 0$                       (2)  $\Delta G = 0$                       (3)  $\Delta H = 0$                       (4)  $\Delta H = \Delta G = \Delta S = 0$

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Chemical kinetics- similar to Page 184, Ex.-1 Q.77.

$$\Delta H = (E_a)_f - (E_a)_b$$

$$\text{Given } (E_a)_f = (E_a)_b$$

$$\text{so } \Delta H = 0$$

**Q.51** At 25°C molar conductance of 0.1 molar aqueous solution of ammonium hydroxide is  $9.54 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$  and at infinite dilution its molar conductance is  $238 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ . The degree of ionisation of ammonium hydroxide at the same concentration and temperature is -

- (1) 2.080 %                      (2) 20.800 %                      (3) 4.008 %                      (4) 40.800 %

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Electrochemistry- similar to Page 15, Ex.-1 Q.24.

$$\alpha = \frac{\pi_m}{\pi_m^\infty} = \frac{9.54}{238} = 0.04008$$

or 4.008 %

**Q.52** Based on equation  $E = -2.178 \times 10^{-18} \text{ J} \left( \frac{Z^2}{n^2} \right)$ , certain conclusions are written. Which of them is not correct ?

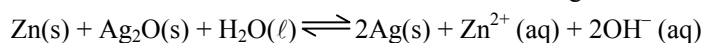
- (1) The negative sign in equation simply means that the energy of electron bound to the nucleus is lower than it would be if the electrons were at the infinite distance from the nucleus.  
 (2) Larger the value of n, the larger is the orbit radius.  
 (3) Equation can be used to calculate the change in energy when the electron changes orbit.  
 (4) For n = 1, the electron has a more negative energy that it does for n = 6 which means that the electron is more loosely bound in the smallest allowed orbit.

**Ans.** [4]

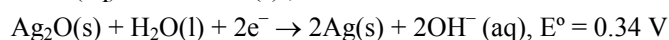
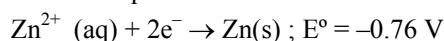
**Sol.** Same discussed in CP Class Theory Notes.

As we move nearer to the nucleus  $e^-$  are more strongly bonded.

**Q.53** A button cell used in watches functions as following



If half cell potentials are

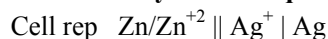


The cell potential will be -

- (1) 1.10 V                      (2) 0.42 V                      (3) 0.84 V                      (4) 1.34 V

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : Electrochemistry, Page 20, Ex.-1 Q.87.



$$E^\circ_{\text{Cell}} = 0.76 + (0.34) = 1.1 \text{ V}$$

**Q.54** How many grams of concentrated nitric acid solution should be used to prepare 250 mL of 2.0 M  $\text{HNO}_3$  ?  
 The concentrated acid is 70 %  $\text{HNO}_3$ .

- (1) 45.0 g conc.  $\text{HNO}_3$     (2) 90.0 g conc.  $\text{HNO}_3$     (3) 70.0 conc.  $\text{HNO}_3$     (4) 54.0 g conc.  $\text{HNO}_3$

**Ans.** [1]

**Sol.** Similar Question discussed in CP Class Theory Notes.

$$\frac{w}{E} = NV$$

$$\frac{w}{63} = 2 \times \frac{250}{1000}$$

$$w = \frac{63}{2} = 31.5 \text{ g}$$

but 70 % solution

70 g is used the wt. of solution is 100 g

31.5 g is used the wt. of solution is ?

$$\frac{100}{70} \times 31.5 = 45 \text{ g}$$

**Q.55** The number of carbon atoms per unit cell of diamond unit cell is -

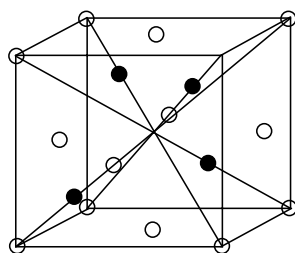
- (1) 4 (2) 8 (3) 6 (4) 1

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Solid state- similar to Page 123, Ex.-3(A) Q.26.

Effective atoms

$$= \frac{1}{8} \times 8 + \frac{1}{2} \times 6 + 4 = 8$$



**Q.56** Maximum deviation from ideal gas is expected from :

- (1) H<sub>2</sub>(g) (2) N<sub>2</sub>(g) (3) CH<sub>4</sub>(g) (4) NH<sub>3</sub>(g)

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Gaseous state- similar to Page 115, Ex.-2 Q.25.

NH<sub>3</sub> is polar molecule

∴ intermolecular force of attraction are very high

∴ a is maximum and deviation is maximum.

**Q.57** A metal has a fcc lattice. The edge length of the unit cell is 404 pm. The density of the metal is 2.72 g cm<sup>-3</sup>.

The molar mass of the metal is :

$$[N_A \text{ Avogadro's constant} = 6.02 \times 10^{23} \text{ mol}^{-1}]$$

- (1) 40 g mol<sup>-1</sup> (2) 30 g mol<sup>-1</sup> (3) 27 g mol<sup>-1</sup> (4) 20 g mol<sup>-1</sup>

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Solid state- similar to Page 116, Ex.-1 Q.24.

$$\rho = \frac{Z \times M_w}{N_A \times V} \qquad V = a^3$$

$$2.72 = \frac{4 \times M_w}{6.02 \times 10^{23} \times 6.6 \times 10^{-23}} \qquad V = (404 \times 10^{-10})^3$$

$$M_w = \frac{2.72 \times 6.023 \times 6.6}{4} \qquad = 6.6 \times 10^{-23}$$

$$= 27 \text{ g/mol.}$$

**Q.58** Dipole - induced dipole interactions are present in which of the following pairs :

- (1) H<sub>2</sub>O and alcohol      (2) Cl<sub>2</sub> and CCl<sub>4</sub>      (3) HCl and He atoms      (4) SiF<sub>4</sub> and He atoms

**Ans.** [3]

**Sol.** Students may find similar question in CP Sheet at : Chemical bonding-Page 238-Q.95).

Dipole - induced dipole interaction present in HCl & He atom. Because HCl molecule is polar and induces dipole in He atom.

**Q.59** A magnetic moment of 1.73 BM will be shown by one among the following -

- (1) [Cu(NH<sub>3</sub>)<sub>4</sub>]<sup>2+</sup>      (2) [Ni(CN)<sub>4</sub>]<sup>2-</sup>      (3) TiCl<sub>4</sub>      (4) [CoCl<sub>6</sub>]<sup>4-</sup>

**Ans.** [1]

**Sol.** Students may find similar question in CP Sheet at : Coordination Compound-Page 77-Q.129).

$$[\text{Cu}(\text{NH}_3)_4]^{2+}$$

$$\text{Cu}^{+2} = [\text{Ar}] 3d^9 \quad n = 1$$

$$\mu = \sqrt{n(n+2)} \quad \text{B.M.}$$

$$\mu = \sqrt{1(1+2)}$$

$$\mu = \sqrt{3}$$

$$\mu = 1.73 \text{ B.M.}$$

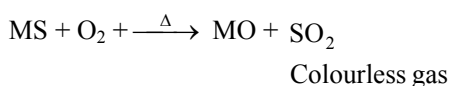
**Q.60** Roasting of sulphides gives the gas X as a byproduct. This is colorless gas with choking smell of burnt sulphur and causes great damage to respiratory organs as a result of acid rain. Its aqueous solution is acidic, acts as a reducing agent and its acid has never been isolated. The gas X is -

- (1) H<sub>2</sub>S      (2) SO<sub>2</sub>      (3) CO<sub>2</sub>      (4) SO<sub>3</sub>

**Ans.** [2]

**Sol.** Students may find this question in CP Class Notes.

Roasting process carried out in reverberatory furnace. It is used for sulphide ore's to convert in metal oxide.



**Q.61** Which is the strongest acid in the following ?

- (1)  $\text{H}_2\text{SO}_4$  (2)  $\text{HClO}_3$  (3)  $\text{HClO}_4$  (4)  $\text{H}_2\text{SO}_3$

**Ans.** [3]

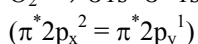
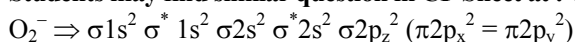
**Sol.** Students may find this question in CP Sheet at : Acid-Base- similar to Page 157, Ex.-1(B) Q.120.  
According to relative acid base strength,  $\text{HClO}_4$  has maximum acidic strength.

**Q.62** Which of the following is paramagnetic ?

- (1)  $\text{CO}$  (2)  $\text{O}_2^-$  (3)  $\text{CN}^-$  (4)  $\text{NO}^+$

**Ans.** [2]

**Sol.** Students may find similar question in CP Sheet at : Chemical Bonding -Page 239-Q.113).



One unpaired electron present in  $\pi^*$  abmo.

**Q.63** Which of the following structure is similar to graphite ?

- (1)  $\text{BN}$  (2)  $\text{B}$  (3)  $\text{B}_4\text{C}$  (4)  $\text{B}_2\text{H}_6$

**Ans.** [1]

**Sol.** Similar question discussed in CP Class Notes.

$\text{BN}$  (Inorganic graphite) and graphite have hexagonal structure ( $\text{sp}^2$ )

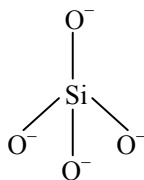
**Q.64** The basic structural unit of silicates is -

- (1)  $\text{SiO}^-$  (2)  $\text{SiO}_4^{4-}$  (3)  $\text{SiO}_3^{2-}$  (4)  $\text{SiO}_4^{2-}$

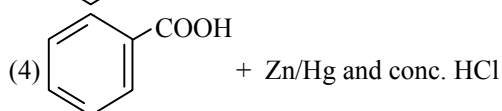
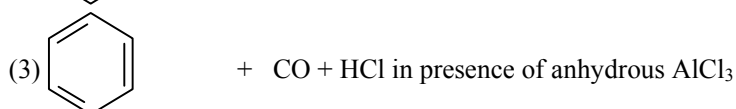
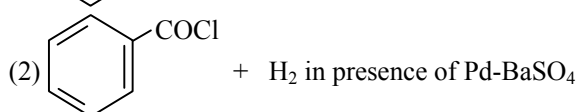
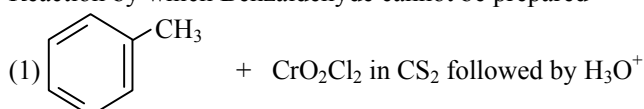
**Ans.** [2]

**Sol.** Student can find similar question in CP class Theory Notes.

Basic unit of silicate is tetrahedral  $\text{SiO}_4^{4-}$



**Q.65** Reaction by which Benzaldehyde cannot be prepared-





Ans. [4]

Sol. Students may find this question in CP Class Theory Notes.

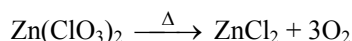
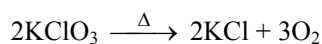
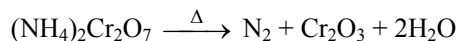
Zn-Hg/conc.HCl is Clemmenson reduction. It can be used for  $\text{—}\overset{\text{O}}{\parallel}{\text{C}}\text{—}$  only.

Q.66 Which of the following does not give oxygen on heating ?

- (1)  $\text{KClO}_3$                       (2)  $\text{Zn}(\text{ClO}_3)_2$                       (3)  $\text{K}_2\text{Cr}_2\text{O}_7$                       (4)  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

Ans. [4]

Sol. Similar Questions from CP Class Theory Notes.

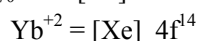


Q.67 Which of the following lanthanoid ions is diamagnetic ? (At. No. Ce = 58, Sm = 62, Eu = 63, Yb = 70)

- (1)  $\text{Ce}^{2+}$                       (2)  $\text{Sm}^{2+}$                       (3)  $\text{Eu}^{2+}$                       (4)  $\text{Yb}^{2+}$

Ans. [4]

Sol. Similar Questions from CP Class Theory Notes.



$n = 0 \therefore$  Diamagnetic

Q.68 Identify the correct order of solubility in aqueous medium-

- (1)  $\text{CuS} > \text{ZnS} > \text{Na}_2\text{S}$     (2)  $\text{ZnS} > \text{Na}_2\text{S} > \text{CuS}$     (3)  $\text{Na}_2\text{S} > \text{CuS} > \text{ZnS}$     (4)  $\text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$

Ans. [4]

Sol. Similar concept discussed in CP Class Theory Notes.

IA group elements sulphide are highly soluble,  $\text{Zn}^{+2}$  is IV group radical and  $\text{Cu}^{+2}$  is II group radical

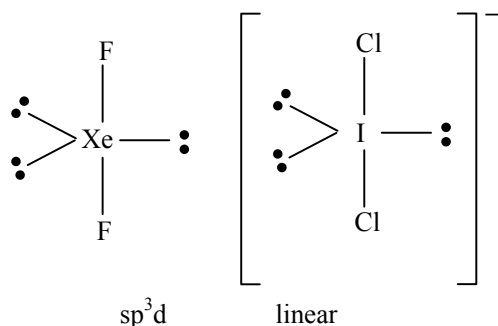
$\therefore \text{Na}_2\text{S} > \text{ZnS} > \text{CuS}$

Q.69  $\text{XeF}_2$  is isostructural with-

- (1)  $\text{TeF}_2$                       (2)  $\text{ICl}_2^-$                       (3)  $\text{SbCl}_3$                       (4)  $\text{BaCl}_2$

Ans. [2]

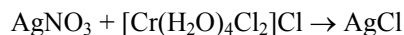
Sol. Students may find this question in CP Sheet : Topic-Chemical bonding at Page no.230, Q.No.48



- Q.70** An excess of  $\text{AgNO}_3$  is added to 100 mL of a 0.01 M solution of dichlorotetraaquachromium (III) chloride. The number of moles of  $\text{AgCl}$  precipitated would be-
- (1) 0.001                      (2) 0.002                      (3) 0.003                      (4) 0.01

**Ans.** [1]

**Sol.** **Similar Question in CP Class Theory Notes.**



$$\begin{aligned} \text{Excess} & \qquad \qquad \text{mole} = MV_{(\text{lit})} \\ & = 0.01 \times \frac{100}{1000} \\ & = 0.001 \end{aligned}$$

- Q.71** Which of these is least likely to act as a Lewis base ?
- (1)  $\text{CO}$                       (2)  $\text{F}^-$                       (3)  $\text{BF}_3$                       (4)  $\text{PF}_3$

**Ans.** [3]

**Sol.** **Students may find this question in CP Sheet : Topic-Acid-Base at Page no.158, Ex.1(B) Q.No.122**

$\text{BF}_3$  is electron deficient so act as Lewis acid.

- Q.72**  $\text{KMnO}_4$  can be prepared from  $\text{K}_2\text{MnO}_4$  as per the reaction :  $3\text{MnO}_4^{2-} + 2\text{H}_2\text{O} \rightleftharpoons 2\text{MnO}_4^- + \text{MnO}_2 + 4\text{OH}^-$ . The reaction can go to completion by removing  $\text{OH}^-$  ions by adding-
- (1)  $\text{HCl}$                       (2)  $\text{KOH}$                       (3)  $\text{CO}_2$                       (4)  $\text{SO}_2$

**Ans.** [3]

**Sol.** **Students may find this question in CP Class Notes.**

$\text{MnO}_4^-$  oxidizes  $\text{HCl}$  and  $\text{SO}_2$  to  $\text{Cl}_2$  and  $\text{SO}_3$  respectively.

$\text{MnO}_4^-$  does not oxidizes  $\text{H}_2\text{CO}_3$  (maximum oxidation state of C)

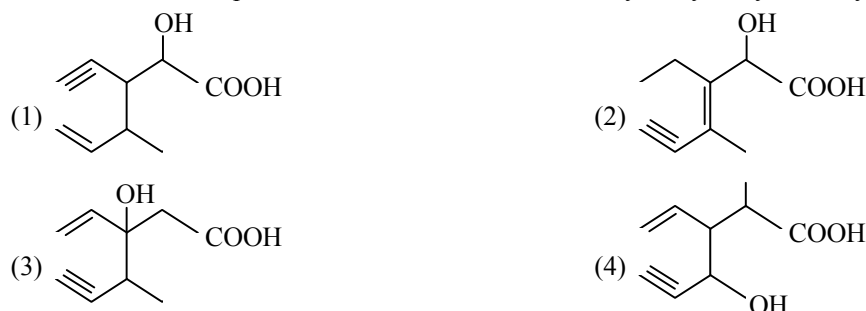
- Q.73** Which of the following is electron-deficient ?
- (1)  $(\text{CH}_3)_2$                       (2)  $(\text{SiH}_3)_2$                       (3)  $(\text{BH}_3)_2$                       (4)  $\text{PH}_3$

**Ans.** [3]

**Sol.** **Students may find this question in CP Sheet : Topic-Chemical bonding at Page no.229, Q.No.37**

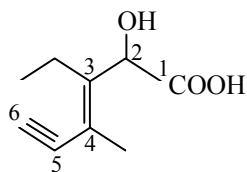
$\text{CH}_3 - \text{CH}_3$ ,  $\text{SiH}_3 - \text{SiH}_3$  and  $\text{PH}_3$  contain eight electron in valence shell. In  $\text{B}_2\text{H}_6$  molecule sufficient electron are not available for bonding and it contain tricentric bond. So  $\text{B}_2\text{H}_6$  molecule is electron deficient.

- Q.74** Structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is-



**Ans.** [2]

Sol. Students may find similar question in CP Class Theory Notes at GOC-I



3-Ethyl-2-hydroxy-4-methyl hex-3-en-5-ynoic acid

Q.75 Which of these is not a monomer for a high molecular mass silicone polymer ?

- (1)  $\text{MeSiCl}_3$                       (2)  $\text{Me}_2\text{SiCl}_2$                       (3)  $\text{Me}_3\text{SiCl}$                       (4)  $\text{PhSiCl}_3$

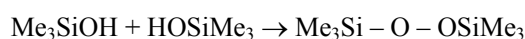
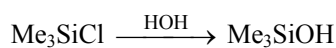
Ans. [3]

Sol. Similar question from CP Class Theory Notes.

Linear chain silicone form by hydrolysis of  $\text{Me}_2\text{SiCl}_2$  followed by condensation.

Cross link silicone form by hydrolysis of  $\text{MeSiCl}_3$ .

$\text{Me}_3\text{SiCl}$  is used to stop chain length



Q.76 Which of the following statements about the interstitial compounds is incorrect ?

- (1) They retain metallic conductivity  
 (2) They are chemically reactive  
 (3) They are much harder than the pure metal  
 (4) They have higher melting points than the pure metal

Ans. [2]

Sol. Similar question from CP Class Theory Notes.

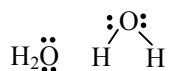
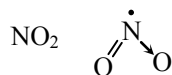
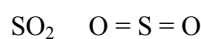
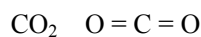
Interstitial compound are chemically inert.

Q.77 Which one of the following molecules contains no  $\pi$  bond ?

- (1)  $\text{CO}_2$                       (2)  $\text{H}_2\text{O}$                       (3)  $\text{SO}_2$                       (4)  $\text{NO}_2$

Ans. [2]

Sol. Similar question from CP Class Theory Notes.



$\text{H}_2\text{O}$  molecule does not contain  $\pi$  bond.

**Q.78** Antiseptics and disinfectants either kill or prevent growth of microorganisms. Identify which of the following statements is not true-

- (1) A 0.2 % solution of phenol is an antiseptic while 1 % solution acts as a disinfectant
- (2) Chlorine and Iodine are used as strong disinfectants
- (3) Dilute solutions of boric acid and hydrogen peroxide are strong antiseptics
- (4) Disinfectants harm the living tissues

**Ans.** [3]

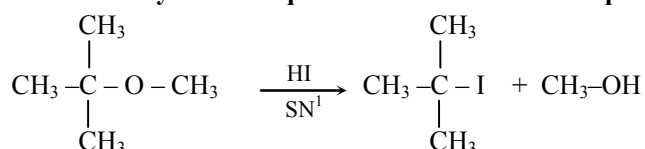
**Sol.** Students may find theory of this question in CP Sheet at Page No.201 of Topic-Chemistry in everyday life. Chlorine is disinfectants but Iodine is antiseptics.

**Q.79** Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI ?

- (1)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{O} - \text{CH}_3$
- (2)  $\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} - \text{O} - \text{CH}_3$
- (3)  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} - \text{O} - \text{CH}_3$
- (4)  $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2 - \text{O} - \text{CH}_3$

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Topic Ether (page no.56)



**Q.80** Nylon is an example of-

- (1) Polyester
- (2) Polysaccharide
- (3) Polyamide
- (4) Polythene

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Topic-Polymers (page no.194)

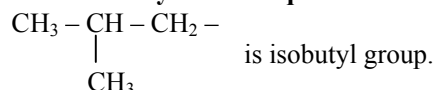
Nylon is polyamide.

**Q.81** The structure of isobutyl group in an organic compound is-

- (1)  $\begin{matrix} \text{CH}_3 \\ \text{CH}_3 \end{matrix} > \text{CH} - \text{CH}_2 -$
- (2)  $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_2 - \text{CH}_3$
- (3)  $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 -$
- (4)  $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} -$

**Ans.** [1]

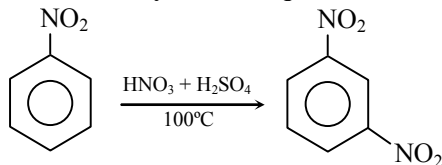
**Sol.** Students may find this question in CP Class Theory Notes at GOC-I



- Q.82** Nitrobenzene on reaction with conc.  $\text{HNO}_3/\text{H}_2\text{SO}_4$  at  $80 - 100^\circ\text{C}$  forms which one of the following products?  
 (1) 1,2-Dinitrobenzene (2) 1,3-Dinitrobenzene  
 (3) 1,4-Dinitrobenzene (4) 1,2,4-Trinitrobenzene

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Topic-Nitrogen compounds (Page no.121)



$\therefore$   $-\text{NO}_2$  group is meta directing group.

- Q.83** Some meta - directing substitution in aromatic substitution are given. Which one is most deactivating ?  
 (1)  $-\text{C}\equiv\text{N}$  (2)  $-\text{SO}_3\text{H}$  (3)  $-\text{COOH}$  (4)  $-\text{NO}_2$

**Ans.** [4]

**Sol.** Students may find this question in CP Class Theory Notes at GOC-II

$-\text{NO}_2$  is strong deactivating group.

- Q.84**  $6.02 \times 10^{20}$  molecules of urea are present in 100 mL of its solution. The concentration of solution is -  
 (1) 0.02 M (2) 0.01 M (3) 0.001 M (4) 0.1 M

**Ans.** [2]

**Sol.** Similar Question in CP Class Theory Notes.

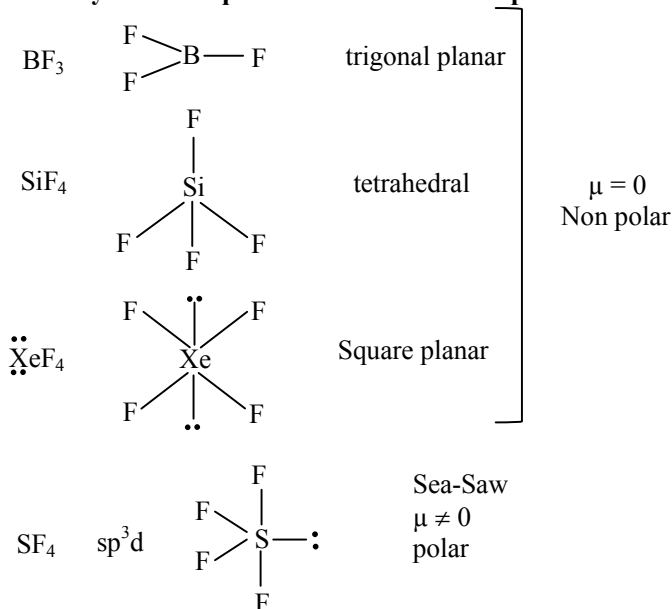
$$M = \frac{\text{mole}}{V(\text{ml})} \times 1000 = \frac{0.001}{100} \times 1000 = 0.01 \text{ M}$$

- Q.85** Which of the following is a polar molecule ?

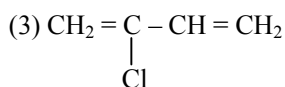
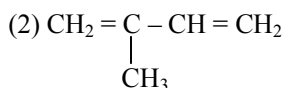
- (1)  $\text{BF}_3$  (2)  $\text{SF}_4$  (3)  $\text{SiF}_4$  (4)  $\text{XeF}_4$

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet : Topic-Chemical bonding at Page no.229, Q.No.35

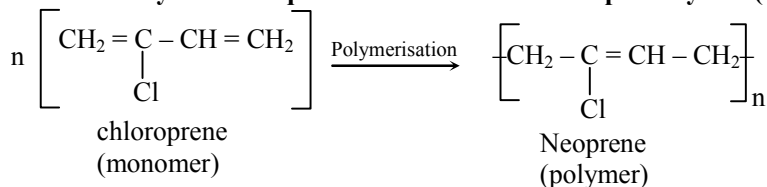


**Q.86** Which is the monomer of Neoprene in the following ?



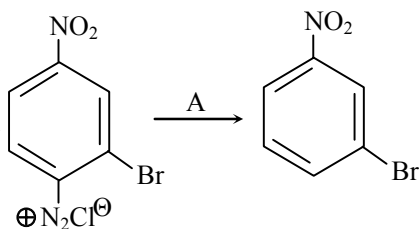
**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Topic-Polymer (Page no.192)

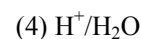
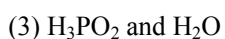
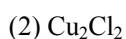


**Q.87**

In the reaction



; A is-



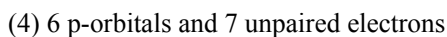
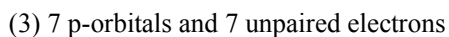
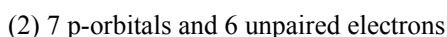
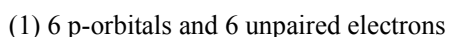
**Ans.** [3]

**Sol.** Students may find similar question in CP Sheet at : Topic-Nitrogen compounds (Page no. 139)

$\text{H}_3\text{PO}_2$  and  $\text{H}_2\text{O}$  works as a reducing agent.

**Q.88**

The radical,  is aromatic because it has-



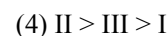
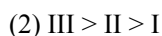
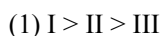
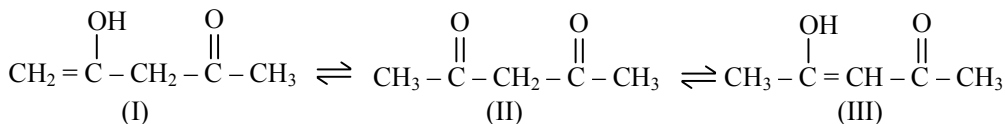
**Ans.** [1]

**Sol.** Students may find similar question in CP Sheet at : Topic-GOC-II (Exercise-II)

Only benzene is considered in aromatic.

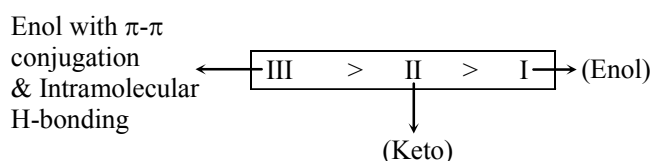
$\therefore$  6p-orbitals ( $\pi$ -electrons) and 6 unpaired electrons are present.

**Q.89** The order of stability of the following tautomeric compounds is-



**Ans.** [2]

**Sol.** Students may find similar question in CP Sheet at : GOC-I (Page no. 51)



**Q.90** Which of the following compounds will not undergo Friedal-Craft reaction easily-  
 (1) Cumene (2) Xylene (3) Nitrobenzene (4) Toluene

**Ans.** [3]

**Sol.** Students may find this question in CP Class Theory Notes at GOC-II.

$-\text{NO}_2$  group is strong deactivating.

$\therefore$  It inhibits F.C.R.

**Q.91** Select the **wrong** statement :

- (1) Isogametes are similar in structure, function and behavior
- (2) Anisogametes differ either in structure, function of behaviour
- (3) In Oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile
- (4) *Chlamydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Plant diversity page no. 80

In oomycetes sexual reproduction occur by Isogamy or Oogamy. In isogamy both the fusing gametes are similar in structure, while in oogamy in oomycetes male gamete and female gamete both are nonmotile and female gamete is large while male gamete is small.

**Q.92** Which one of the following is not a correct statement ?

- (1) Herbarium houses dried, pressed and preserved plant specimens
- (2) Botanical gardens have collection of living plants for reference
- (3) A museum has collection of photographs of plants and animals
- (4) Key is a taxonomic aid for identification of specimens

**Ans.** [3]

**Sol.** Students may find this question in NCERT page no. 12 (XIth Class)

Museum is the collection of dead and preserved specimen of animals generally.

**Q.93** Isogamous condition with non-flagellated gametes is found in:

- (1) *Chlamydomonas* (2) *Spirogyra* (3) *Volvox* (4) *Fucus*

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Lower Plant page no. 19

In spirogyra isogamy occur by nonmotile gametes.

**Q.94** Besides paddy fields, cyanobacteria are also found inside vegetative part of :

- (1) *Pinus*                      (2) *Cycus*                      (3) *Equisetum*                      (4) *Psilotum*

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Plant Diversity page no. 47

Coralloid root of cycas plant possess cyanobacteria

**Q.95** Megasporangium is equivalent to :

- (1) Embryo sac                      (2) Fruit                      (3) Nucellus                      (4) Ovule

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Reproduction in flowering plants page no. 15

Ovule is megasporangium and have sporogenous cells which produce megaspore by meiosis

**Q.96** Read the following statements (A– E) and answer the question which follows them :

- (A) In liverworts, mosses and ferns gametophytes are free-living  
(B) Gymnosperms and some ferns are heterosporous  
(C) Sexual reproduction in *Fucus*, *Volvox* and *Albugo* is oogameous  
(D) The sporophytes in liverworts is more elaborate than that in mosses  
(E) Both, *Pinus* and *Marchentia* are dioecious

How many of the above statements are correct ?

- (1) One                      (2) Two                      (3) Three                      (4) Four

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Plant Diversity

Statement A, B and C are correct

**Q.97** Among bitter gourd, mustard, brinjal, pumpkin, china rose, lupin, cucumber, sunnhemp, gram, guava, bean, chilli, plum, petunia, tomato, rose, withania, potato, onion, aloe and tulip how many plants have hypogynous flower ?

- (1) Six                      (2) Ten                      (3) Fifteen                      (4) Eighteen

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 134, 137, 140, 143.

Mustard, brinjal, chinrose, chili, petunia, tomato, withania, Potato, onion, aloe, tulip, lupin, sunnhemp, gram and bean. Fifteen plant have hypogynous flower.

**Q.98** Interfascicular cambium develops from the cells of :

- (1) Medullary rays                      (2) Xylem parenchyma                      (3) Endodermis                      (4) Pericycle

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 36

Interfascicular cambium is developed from the cells of medullary ray



**Q.99** In china rose the flowers are :

- (1) Actinomorphic, hypogynous with twisted aestivation
- (2) Actinomorphic, epigynous with valvate aestivation
- (3) Zygomorphic, hypogynous with imbricate aestivation
- (4) Zygomorphic, epigynous with twisted aestivation

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 137  
Malvaceae family

**Q.100** Lenticels are involved in

- (1) Transpiration
- (2) Gaseous exchange
- (3) Food transport
- (4) Photosynthesis

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 40.  
Lenticels are involved in gaseous exchange of tree trunk and environment

**Q.101** Age of a tree can be estimated by :

- (1) Its height and girth
- (2) Biomass
- (3) Number of annual rings
- (4) Diameter of its heartwood

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 39  
Generally one annual ring is formed in one year due to secondary growth. Thus by counting annual ring, age of tree can be determined

**\*Q.102** Seed coat is not thin membranous in :

- (1) Maize
- (2) Coconut
- (3) Groundnut
- (4) Gram

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Structural organization in plant at page no. 14  
Seed coat of legume (gram) is hard and thick due to presence of sclereids

**Q.103** Transition state structure of the substrate formed during an enzymatic reaction is

- (1) Transient but stable
- (2) Permanent but unstable
- (3) Transient and unstable
- (4) Permanent and stable

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Plant physiology Eng. page no. 117  
Transition state is intermediate state produced during enzymatic biochemical reaction which is transition state and unstable state

**Q.104** A phosphoglyceride is always made up of :

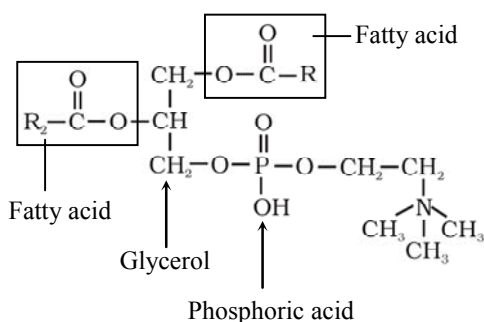
- (1) Only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
- (2) Only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
- (3) A saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached
- (4) A saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule

**Ans.** [3]

**Sol.** Students may find this question in NCERT page 144

Fatty acid can be saturated or unsaturated. Here fatty acid are found esterified with glycerol which is attached with phosphate group

Ex. Lecithin



**Q.105** Pigment-containing membranous extensions in some cyanobacteria are

- (1) Heterocysts
- (2) Basal bodies
- (3) Pneumatophores
- (4) Chromatophores

**Ans.** [4]

**Sol.** Students may find this question in NCERT page no 129 XI class

Photosynthetic pigment are present in membranous extension chromatophore in cyanobacteria

**Q.106** A major site for synthesis of lipids is :

- (1) RER
- (2) SER
- (3) Symplast
- (4) Nucleoplasm

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Cell biology page no. 36

The site for lipid synthesis is SER

**Q.107** The complex formed by a pair of synapsed homologous chromosomes is called :

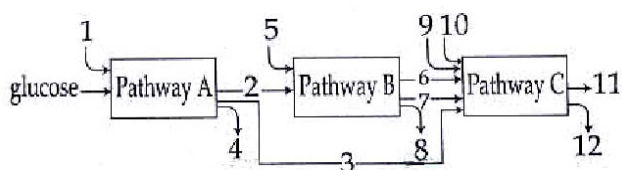
- (1) Equatorial plate
- (2) Kinetochore
- (3) Bivalent
- (4) Axoneme

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Cell biology page no. 54

Homologous chromosome are paired and synapsed during zygotene stage of meiosis-I and known as bivalent

- Q.108** The three boxes in this diagram represent the three major biosynthetic pathways in aerobic respiration. Arrows represent net reactants or products



Arrows numbered 4, 8, and 12 can all be

- (1) NADH                      (2) ATP                      (3) H<sub>2</sub>O                      (4) FAD<sup>+</sup> or FADH<sub>2</sub>

**Ans.** [2]

**Sol.** Pathway-A is glycolysis

Pathway-B is Krebs cycle

Pathway-C is Electron transport system

**1, 5 are respiratory substrates like protein and fats**

**6,7,3,9,10 are NADH<sub>2</sub>, FADH<sub>2</sub>**

**\* 4, 8, 12 are ATP produced**

- Q.109** The most abundant intracellular cation is :

- (1) Na<sup>+</sup>                      (2) Ca<sup>++</sup>                      (3) H<sup>+</sup>                      (4) K<sup>+</sup>

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Animal physiology-II page no. 202

K<sup>+</sup> is most abundant ion of intracellular fluid while Na<sup>+</sup> is extra cellular fluid.

- Q.110** During seed germination its stored food is mobilized by :

- (1) Ethylene                      (2) Cytokinin                      (3) ABA                      (4) Gibberellin

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Plant physiology English page no 147

Gibberellin have characteristic function breaking of seed dormancy by activating stored food hydrolyzing enzymes amylase, lipase, protease.

- Q.111** Which of the following criteria does not pertain to facilitated transport ?

- (1) Requirement of special membrane proteins  
(2) High selectivity  
(3) Transport saturation  
(4) Uphill transport

**Ans.** [4]

**Sol.** Students may find this question in CP class notes plant physiology (mineral nutrition)

NCERT Bio 11<sup>th</sup> English page no. 178 table 11.1

Facilitated transport means transport with help of carrier proteins which may be both uphill i.e. against the concentration gradient and down hill i.e. in order of concentration gradient which is also called as facilitated diffusion or passive facilitated transport

- Q.112** The first stable product of fixation of atmospheric nitrogen in leguminous plants is :  
 (1)  $\text{NO}_2^-$  (2) Ammonia (3)  $\text{NO}_3^-$  (4) Glutamate

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Plant physiology English page no. 224  
 NCERT 11<sup>th</sup> class English page no 202

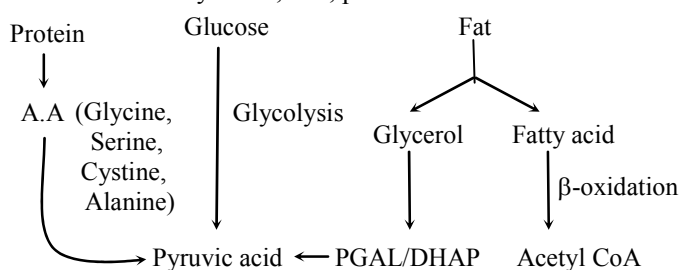
Product of fixation of  $\text{N}_2$  in leguminous plants by its symbiotic associate Rhizobium bacteria, in root nodules is  $\text{NH}_3$  (ammonia)

- \*Q.113** Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins ?  
 (1) Glucose-6-phosphate (2) Fructose 1, 6-bisphosphate  
 (3) Pyruvic acid (4) Acetyl CoA

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Plant physiology English page no. 68  
 NCERT XI<sup>th</sup> class English page no. 235

Pyruvic acid is intermediate compound which is produced during oxidation of all types of respiratory substrates carbohydrates, fats, proteins



\* option (4) Acetyl CoA may also be answer but more appropriate is pyruvic acid as it formed directly by all these respiratory substrates.

- Q.114** Which one of the following statements is correct ?  
 (1) Hard outer layer of pollen is called intine  
 (2) Sporogenous tissue is haploid  
 (3) Endothecium produces the microspores  
 (4) Tapetum nourishes the developing pollen

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet at : Reproduction in Flowering plant English page no. 7  
 Tapetum is innermost layer of anther provide nutrition to developing microspore / pollens.

- Q.115** Product of sexual reproduction generally generates :  
 (1) Longer viability of seeds  
 (2) Prolonged dormancy  
 (3) New genetic combination leading to variation  
 (4) Large biomass

**Ans.** [3]

**Sol.** Sexual reproduction leads to new genetic combination leading to variation as it involves mixing of gametes to two different parents which are produced (gametes) by meiosis

**Q.116** Meiosis takes place in :

- (1) Meiocyte                      (2) Conidia                      (3) Gemmule                      (4) Megaspore

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : Cell biology page no. 56

Meiocyte are the cells in which meiosis occur

**Q.117** Advantage of cleistogamy is :

- (1) Higher genetic variability                      (2) More vigorous offspring  
(3) No dependence on pollinators                      (4) Vivipary

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet at : Reproduction in flowering plant English page no. 23

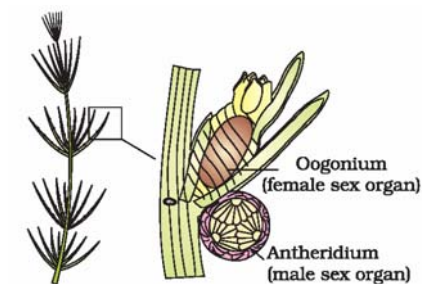
Cleistogamy means closed flower which are bisexual does not requires pollinator still have assured seed set.

**Q.118** Monoecious plant of *Chara* shows occurrence of :

- (1) Antheridiophore and archegoniophore on the same plant  
(2) Stamen and carpel on the same plant  
(3) Upper antheridium and lower oogonium on the same plant  
(4) Upper oogonium and lower antheridium on the same plant

**Ans.** [4]

**Sol.** Students may find this question in NCERT fig 1.6 XII class



**Q.119** Perisperm differs from endosperm in :

- (1) Being a haploid tissue  
(2) Having no reserve food  
(3) Being a diploid tissue  
(4) Its formation by fusion of secondary nucleus with several sperms

**Ans.** [3]

**Sol.** Perisperm is persistent nucellus within seeds. It is not common as nucellus is nutritive tissue provide nutrition to embryosac. Nucellus is diploid tissue. In Beet, Piper it is persists within seed so it is diploid (2n) while endosperm is a triploid (3n) tissue

- Q.120** Which of the following statements is not true of two genes that show 50% recombination frequency ?
- (1) The genes may be on different chromosomes
  - (2) The genes are tightly linked
  - (3) The genes show independent assortment
  - (4) If the genes are present on the same chromosome, they undergo more than one crossovers in every meiosis.

**Ans.** [2]

**Sol.** Students may find this question in NCERT page 83

If gene are present on same chromosome and tightly linked they show very few recombinant so they show 50% recombinant is wrong statement.

- Q.121** Variation in gene frequencies within populations can occur by chance rather than by natural selection. This is referred to as :
- (1) Genetic flow
  - (2) Genetic drift
  - (3) Random mating
  - (4) Genetic load

**Ans.** [2]

**Sol.** Students may find this question in NCERT page 137

If gene migration due to gene flow happens multiple times this variation in gene frequency change occurs by chance is genetic drift.

- Q.122** If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group : 'AB' blood group : 'B' blood group in 1 : 2 : 1 ratio. Modern technique of protein electrophoresis reveals presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of :

- (1) Codominance
- (2) Incomplete dominance
- (3) Partial dominance
- (4) Complete dominance

**Ans.** [1]

**Sol.** Students may find this question in NCERT page 77

$I^A$  and  $I^B$  present together they both express their own type of sugar on the surface of RBC is codominance

- Q.123** The process by which organisms with different evolutionary history evolve similar phenotypic adaptations in response to a common environmental challenge is called :
- (1) Natural selection
  - (2) Convergent evolution
  - (3) Non-random evolution
  - (4) Adaptive radiation

**Ans.** [2]

**Sol.** Due to common environmental changes different animals develop similar looking feature. This phenomenon is known as convergent evolution.

- Q.124** The tendency of population to remain in genetic equilibrium may be disturbed by :
- (1) random mating
  - (2) lack of migration
  - (3) lack of mutations
  - (4) lack of random mating

**Ans.** [4]

**Sol.** Students may find this question in NCERT page 136

Gene frequency remain stable or constant from generation to generation in a random mating population is Hardy weinberg principle if population lack random mating than

**Q.125** Which of the following Bt crops is being grown in India by the farmers ?

- (1) Maize                      (2) Cotton                      (3) Brinjal                      (4) Soybean

**Ans.** [2]

**Sol.** Bt cotton is commonly grown Bt crop of India.

**Q.126** A good product of citric acid is :

- (1) *Aspergillus*                      (2) *Pseudomonas*                      (3) *Clostridium*                      (4) *Saccharomyces*

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Plant Diversity

*Aspergillus niger* is used in formation of citric acid

**Q.127** DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by :

- (1) Centrifugation                      (2) Polymerase chain reaction  
(3) Electrophoresis                      (4) Restriction mapping

**Ans.** [3]

**Sol.** Students may find this question in NCERT page 198

DNA fragment generated by restriction endonuclease is separated by Gel-electrophoresis.

**Q.128** Which of the following is not correctly matched for the organism and its cell wall degrading enzyme ?

- (1) Bacteria-Lysozyme    (2) Plant cells- Cellulase    (3) Algae-Methylase    (4) Fungi - Chitinase

**Ans.** [3]

**Sol.** Methylase enzyme is used for methylation.

**Q.129** The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of :

- (1) Non-recombinant bacteria containing beta-galactosidase  
(2) Insertional inactivation of alpha-galactosidase in non-recombinant bacteria  
(3) Insertional inactivation of alpha-galactosidase in recombinant bacteria  
(4) Inactivation of glycosidase enzyme in recombinant bacteria

**Ans.** [1]

**Sol.** Students may find this question in NCERT page 200

Lac operon Z-gene produce beta *galactosidase* that convert X-gal chromogen into blue colour in non recombinant bacteria if this gene is affected by insertion inactivation this reaction does not take place and bacteria appears white. But this inactivation take place in beta-galactosidase gene not in  $\alpha$ -galactosidase gene in recombinant bacteria so right answer is non recombinant bacteria containing beta galactosidase enzyme that cause blue colour colonies of bacteria.

**Q.130** Which of the following are likely to be present in deep sea water ?

- (1) Archaeobacteria                      (2) Eubacteria                      (3) Blue-green algae                      (4) Saprophytic fungi

**Ans.** [1]

**Sol.** In deep sea water no light is reach the archaeobacteria like sulphur bacteria methanomonas are present and their nutritional category is chemoautotrophs or chemosynthetic bacteria.

**Q.131** Natural reservoir of phosphorus is :

- (1) Sea water                      (2) Animal bones                      (3) Rock                      (4) Fossils

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet Ecology Eng. Page No. 104

Phosphorous cycle is sedimentary cycle whose reservoir lies in Rocks and Sediments

**Q.132** Secondary productivity is rate of formation of new organic matter by :

- (1) Producer                      (2) Parasite                      (3) Consumer                      (4) Decomposer

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet Ecology Page NO. 95

Secondary productivity is biomass assimilated by consumers.

**Q.133** Which one of the following is not used for *ex situ* plant conservation?

- (1) Field gene banks                      (2) Seed banks                      (3) Shifting cultivation                      (4) Botanical Gardens

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet Ecology Eng. Page No. 96

Shifting cultivation or Jhum cultivation is a kind of deforestation not conservation.

**Q.134** Kyoto-Protocol was endorsed at :

- (1) CoP-3                      (2) CoP-5                      (3) CoP-6                      (4) CoP-4

**Ans.** [1]

**Sol.** Kyoto protocol was endorsed at CoP-3

CoP – Conference of Parties occurs before and after the endorsement of kyoto protocol.

CoP-1 : held at Berlin (Germany) also known as Berlin mendeate in 1995.

CoP-2 : held at Geneva (Switzerland) also known as Ministerial Declaration.

Cop-3 : held at kyoto, (Japan) in 1997 endorsed kyoto protocol.

**Q.135** Which of the following represent maximum number of species among global biodiversity ?

- (1) Algae                      (2) Lichens                      (3) Fungi                      (4) Mosses and Ferns

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet Ecology English Page No. 140

Fungi has highest species diversity among all plant groups.

**Q.136** Match the name of the animal (Column I), with one characteristics (Column II), and the phylum/class (column III) to which it belongs :

	Column I	Column II	Column III
(1)	<i>Petromyzon</i>	ectoparasite	Cyclostomata
(2)	<i>Ichthyophis</i>	terrestrial	Reptilia
(3)	<i>Limulus</i>	body covered by chitinous exoskeleton	Pisces
(4)	<i>Adamsia</i>	radially symmetrical	Porifera



**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Page 104-105

Petromyzone is a vertebrate belonging to cyclostomata (cyclo = Rounded, Stoma = mouth) They remain as an ectoparasite on marine fishes & turtles.

**Q.137** Which of the following are correctly matched with respect of their taxonomic classification ?

- (1) Flying fish, cuttlefish, silverfish – Pisces
- (2) Centipede, millipede, spider, scorpion-Insecta
- (3) House fly, butterfly, tsetsefly, silverfish-Insecta
- (4) Spiny anteater, sea urchin, sea cucumber-Echinodermata

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Page 37

House fly, butterfly, tsetse fly, silverfish, all are Insects

**Q.138** Which group of animals belong to the same phylum ?

- (1) Malarial parasite, *Amoeba*, Mosquito
- (2) Earthworm, Pinworm, Tapeworm
- (3) Prawn, Scorpion, *Locusta*
- (4) Sponge, Sea anemone, Starfish

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Page 36-37

Prawn, Scorpion & *Locusta* all belong to phylum Arthropoda

**Q.139** One of the representatives of Phylum Arthropoda is :

- (1) cuttlefish
- (2) silverfish
- (3) pufferfish
- (4) flying fish

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet : Page 36-37

Silverfish (Book-worm) belongs to phylum arthropoda

**Q.140** The H-zone in the skeletal muscle fibre is due to -

- (1) the absence of myofibrils in the central portion of A-band
- (2) the central gap between myosin filaments in the A-band
- (3) the central gap between actin filaments extending through myosin filaments in the A-band
- (4) extension of myosin filaments in the central portion of the A-band.

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : animal physiology-I on Page 43

The edges of thin filament (Actin) on either side of thick filaments (myosin) partially overlap the free ends of the thick filaments (myosin) leaving the central part of thick filament (myosin). This central part of thick filament (myosin), not overlapped by thin filaments (Actin) is called the 'H'-zone.

**Q.141** What external changes are visible after the last moult of a cockroach nymph ?

- (1) Mandibles become harder
- (2) Anal cerci develop
- (3) Both fore wings and hind wings develop
- (4) Labium develops

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : lower animal on page No. 101

The next to last nymphal stage has wing pads but only adult cockroaches have wings.

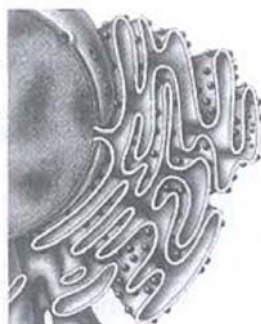
- Q.142** The Golgi complex plays a major role :
- (1) in trapping the light and transforming it into chemical energy
  - (2) in digensting proteins and carbohydrates
  - (3) as energy transferring organelles
  - (4) in post translational modification of proteins and glycosidation of lipids

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Cell Biology

Golgi complex is involved in glycosidation of protein and lipid and formation of glycolipid and glycoprotein.

- Q.143** Which one of the following organelle in the figure correctly matches with its function ?



- (1) Rough endoplasmic reticulum, formation of glycoproteins
- (2) Golgi apparatus, protein synthesis
- (3) Golgi apparatus, formation of glycolipids
- (4) Rough endoplasmic reticulum, protein synthesis

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Cell Biology page no. 24 & 26

Given figure is RER, which is involved in protein synthesis

- Q.144** Macro molecule chitin is :

- (1) nitrogen containing polysaccharide
- (2) phosphorus containing polysaccharide
- (3) sulphur containing polysaccharide
- (4) simple polysaccharide

**Ans.** [1]

**Sol.** Students may find this question in NCERT XIth Class page 149

Chitin is polymer of N-acetyl galactosamine (NAGA) so it is Nitrogen containing polysaccharide

- Q.145** The essential chemical components of many coenzymes are :

- (1) Proteins
- (2) Nucleic acids
- (3) Carbohydrates
- (4) Vitamins

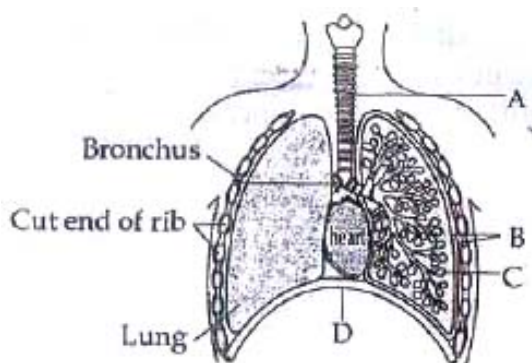
**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Plant physiology page no. 119

Coenzymes are loosely attached organic parts of conjugated enzymes which are generally derivatives of vitamins.



- Q.149** The figure shows a diagrammatic view of human respiratory system with labels A, B, C and D. Select the option which gives correct identification and main function and / or characteristic.



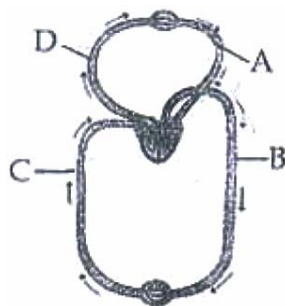
- (1) A-trachea long tube supported by complete cartilaginous rings for conducting inspired air
- (2) B-pleural membrane – surround ribs on both sides to provide cushion against rubbing.
- (3) C-Alveoli – thin walled vascular bag like structures for exchange of gases.
- (4) D-Lower end of lungs – diaphragm pulls it down during inspiration.

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Page 54-55

Alveoli in lungs are thin walled air sacs where gaseous exchange takes place

- Q.150** Figure shows schematic plant of blood circulation in humans with labels A to D. Identify the label and give its function/s.



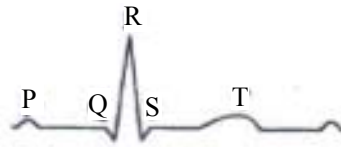
- (1) A-Pulmonary vein-takes impure blood from body parts,  $PO_2 = 60$  mm Hg
- (2) B-Pulmonary artery – takes blood from heart to lungs,  $PO_2 = 90$  mm Hg
- (3) C-Vena Cava-takes blood from body parts to right auricle,  $PCO_2 = 45$  mm Hg
- (4) D-Dorsal aorta – takes blood from heart to body parts,  $PO_2 = 95$  mm Hg

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Page No. 88

Vena Cava takes blood from to body parts to right auricle. Partial pressure of  $CO_2$  is 45 mmHg Hg under which  $CO_2$  is taken form tissues.

**Q.151** The diagram given here is the standard ECG of a normal person. The P-wave represents the :



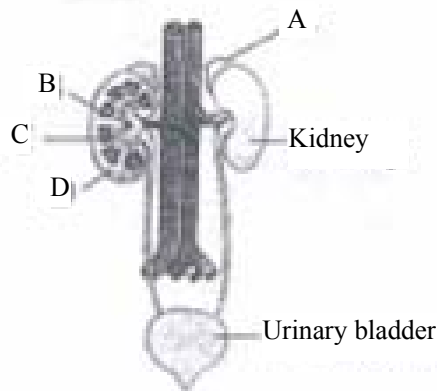
- (1) Contraction of both the atria  
 (2) Initiation of the ventricular contraction  
 (3) Beginning of the systole  
 (4) End of systole

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Animal physiology Page - 102

P wave in an ECG shows contraction of both the atria

**Q.152** Figure shows human urinary system with structures labeled A to D. Select option which correctly identifies them and gives their characteristics and/or functions.



- (1) A-Adrenal gland-located at the anterior part of Kidney. Secrete Catecholamines which stimulate glycogen breakdown  
 (2) B-Pelvis-broad funnel shaped space inner to hilum, directly connected to loops of Henle.  
 (3) C-Medulla-inner zone of kidney and contains complete nephrons.  
 (4) D-Cortex-outer part of kidney and do not contain any part of nephrons.

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Animal physiology Page – 159

In the given answer function of adrenal gland is correctly given that it releases adrenaline & nor adrenaline (collectively known as catecholamine) that stimulates glycogen breakdown during emergencies.

**Q.153** Select the correct statement with respect to locomotion in humans :

- (1) A decreased level of progesterone causes osteoporosis in old people.  
 (2) Accumulation of uric acid crystals in joints causes their inflammation.  
 (3) The vertebral column has 10 thoracic vertebrae.  
 (4) The joint between adjacent vertebrae is a fibrous joint.

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet : Animal physiology-IPage – 119

Gouty arthritis is caused by excessive formation of uric acid. It gets deposited in joints as monosodium salts.

**Q.154** The characteristics and an example of a synovial joint in humans is :

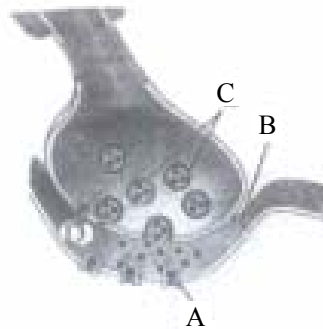
	Characteristics	Examples
(1)	Fluid cartilage between two bones, limited movements	Knee joint
(2)	Fluid filled between two joints, provides cushion	Skull bones
(3)	Fluid filled synovial cavity between two bones	Joint between atlas and axis
(4)	Lymph filled between two bones, limited movement	Gliding joint between carpals

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Animal physiology-I Page – 115

In between two bones a space is found called synovial space or cavity this space provides free movement to the bone.

**Q.155** A diagram showing axon terminal and synapse is given. Identify correctly at least two of A-D.



(1) A-Receptor ; C-Synaptic vesicles

(2) B-Synaptic connection ; D- $K^+$

(3) A-Neurotransmitter ; B- Synaptic cleft

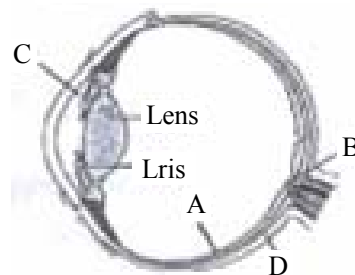
(4) C-Neurotransmitter ; D- $Ca^{++}$

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet at : Animal Physiology-II on page no 205

In this diagrammatic question 'A' label is correct which represent receptor of neurotransmitter and C label represent synaptic vesicle

**Q.156** Parts A, B, C and D of the human eye are shown in the diagram. Select the option which gives correct identification along with its functions/characteristics :



(1) A-Retina-contains photo receptors-rods and cones.

(2) B-Blind spot-has only a few rods and cones

(3) C-Aqueous chamber- reflects the light which does not pass through the lens

(4) D-choroid – its anterior part forms ciliary body

Ans. [1]

Sol. Students may find this question in CP Sheet at : Animal physiology-II on page no 263

In this diagrammatic question 'A' label is correct with its function / Character because of Retina contain photosensory receptor – rod and cones

Q.157 Which of the following statements is correct in relation to the endocrine system ?

- (1) Adenohypophysis is under direct neural regulation of the hypothalamus
- (2) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones
- (3) Non-nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as hormones
- (4) Releasing and inhibitory hormones are produced by the pituitary gland

Ans. [3]

Sol. Students may find this question in CP Sheet at : Animal physiology-II on page no. 134

Hormones are non-nutritional chemical substances which produced by body / glands in traces

Q.158 Select the answer which correctly matches the endocrine gland with the hormone it secretes and its function/deficiency symptom :

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

Ans. [3]

Sol. Students may find this question in CP Sheet : Animal physiology-II Page – 148

Thyroid gland synthesis thyroxine with the help of iodine and lack of iodine in diet results in goitre

Q.159 What is the correct sequence of sperm formation ?

- (1) Spermatid, spermatocyte, spermatogonia, spermatozoa
- (2) Spermatogonia, spermatocyte, spermatozoa, spermatid
- (3) Spermatogonia, spermatozoa, spermatocyte, spermatid
- (4) Spermatogonia, spermatocyte, spermatid, spermatozoa

Ans. [4]

Sol. Students may find this question in CP Sheet : Reproductive system Page – 49

The correct sequence of spermatogenesis is spermatogonia, spermatocyte, spermatid & spermatozoa

Q.160 Menstrual flow occurs due to lack of :

- (1) Progesterone                      (2) FSH                                      (3) Oxytocin                                      (4) Vasopressin

Ans. [1]

Sol. Students may find this question in CP Sheet : Reproductive system Page – 20-21

Fall in the level of progesterone results in menstrual flow due to breaking of the blood vessels of uterine wall

**Q.161** Which one of the following is not the function of placenta ? it :

- (1) facilitates supply of oxygen and nutrients to embryo
- (2) secretes estrogen
- (3) Facilitates removal of carbon dioxide and waste material from embryo
- (4) Secretes oxytocin during parturition

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Reproductive system Page – 28

Oxytocin is released from the neurohypophysis of pituitary gland at the time of child birth

**\*Q.162** One of the legal methods of birth control is :

- (1) abortion by taking an appropriate medicine
- (2) by abstaining from coitus from day 10 to 17 of the menstrual cycle
- (3) by having coitus at the time of day break
- (4) by a premature ejaculation during coitus

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Reproductive system Page – 94

MTP can be non surgically performed on prescription of mifepristone+Prostaglandins on the prescription of registered medical practitioner under his supervision.

This is legal method of termination of pregnancy.

Duration of menstrual cycle in all female is not fixed hence ovulation can occur anytime between 8 to 19th day hence this method of abstinence is not practically possible for birth control.

**Q.163** Which of the following cannot be detected in a developing foetus by amniocentesis ?

- (1) Klinefelter syndrome
- (2) Sex of the foetus
- (3) Down syndrome
- (4) jaundice

**Ans.** [4]

**Sol.** Jaundice cant be detected by amniocentesis.

**Q.164** Artificial insemination means :

- (1) transfer of sperms of a healthy donor to a test tube containing ova
- (2) transfer of sperms of husband to a test tube containing ova
- (3) artificial introduction of sperms of a healthy donor into the vagina
- (4) introduction of sperms of a healthy donor directly into the ovary

**Ans.** [3]

**Sol.** Students may find this question in CP Sheet : Reproductive system Page – 96

Artificial insemination means artificially introduction of sperms of a healthy donor into the vagina.

**Q.165** Which mendelian idea is depicted by a cross in which the F<sub>1</sub> generation resembles both the parents ?

- (1) incomplete dominance
- (2) law of dominance
- (3) inheritance of one gene
- (4) co-dominance

**Ans.** [2]

**Sol.** This is codominance but question is concern with mendel idea so it depicted with mendel idea of law of dominance.

**Q.166** The incorrect statement with regard to Haemophilia is :

- (1) It is a sex-linked disease
- (2) It is a recessive disease
- (3) It is a dominant disease
- (4) A single protein involved in the clotting of blood is affected

**Ans.** [3]

**Sol.** Students may find this question in NCERT Page No. 89

Haemophilia is sex linked recessive disease

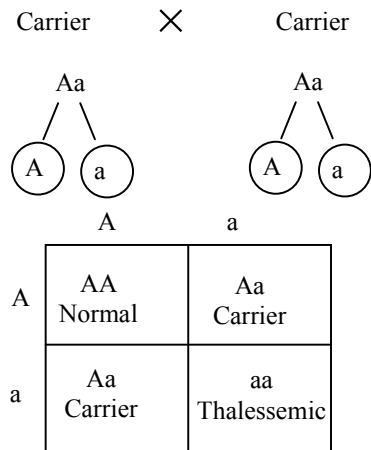


**Q.167** If both parents are carriers for thalassemia, which is an autosomal recessive disorder, what are the chances of pregnancy resulting in an affected child ?

- (1) no chance                      (2) 50%                      (3) 25%                      (4) 100%

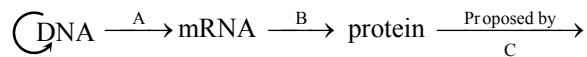
**Ans.** [3]

**Sol.** Thalassemia is autosomal recessive disease if both parent are carrier then their genotype will be



So probability is 1/4 or 25%

**Q.168** The diagram 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-Erevin Chargaff  
 (3) A-transcription B-translation C-Francis Crick  
 (4) A-translation B-extension C-Rosalind Franklin

**Ans.** [3]

**Sol.** Students may find this question in NCERT Page No. 98

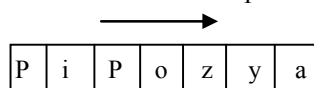
This is central dogma in molecular biology proposed by Francis Crick

**Q.169** Which enzyme/s will be produced in a cell in which there is a non-sense mutation in the *lac Y* gene ?

- (1)  $\beta$ -galactosidase                      (2) Lactose permease  
 (3) Transacetylase                      (4) Lactose permease and transacetylase

**Ans.** [1]

**Sol.** Non sense mutation is point mutation which result in premature stop codon so transcription stop there.



Non sense mutation take place here  
 then y and a gene will not  
 transcribe so only  $\beta$ -galactosidase  
 gene (z-gene) will transcribe.

**Q.170** According to Darwin, the organic evolution is due to -

- (1) Intraspecific competition
- (2) Interspecific competition
- (3) Competition within closely related species
- (4) Reduced feeding efficiency in one species due to the presence of interfering species.

**Ans.** [2]

**Sol.** Students may find this question in CP Sheet at : Origin & Evolution of Life Page - 31

According to Darwinism competition between two different species is the key factor for organic evolution Since it results in divergent evolution.

**Q.171** The eye of octopus and eye of cat show different patterns of structure, yet they perform similar function, This is an example of :

- (1) Homologous organs that have evolved due to convergent evolution
- (2) Homologous organs that have evolved due to divergent evolution
- (3) Analogous organs that have evolved due to convergent evolution
- (4) Analogous organs that have evolved due to divergent evolution

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Ecology Page No. – 31

Eye of octopus & cat are analogous organs since they are different in structure but perform same function. This is an example of divergent evolution.

**Q.172** Infection of *Ascaris* usually occurs by :

- (1) drinking water containing eggs of *Ascaris*
- (2) eating imperfectly cooked pork
- (3) Tse-tse fly
- (4) mosquito bite

**Ans.** [1]

**Sol.** Students may find this question in CP Sheet : Lower Animals Page No. 38

Contaminated water and soil (with eggs of *Ascaris*) is the source of infection with *Ascaris*

**Q.173** The cell-mediated immunity inside the human body is carried out by :

- (1) T- lymphocytes
- (2) B-lymphocytes
- (3) Thrombocytes
- (4) Erythrocytes

**Ans.** [1]

**Sol.** Students may find this question in NCERT Page No. 151

T-Lymphocytes mediate C.M.I (cell-mediated immunity.)

**Q.174** In plant breeding programmes, the entire collection (of plants/seeds) having all the diverse alleles for all genes in a given crop is called :

- (1) selection of superior recombinants
- (2) cross-hybridisation among the selected parents
- (3) evaluation and selection of parents
- (4) germplasm collection

**Ans.** [4]

**Sol.** Students may find this question in CP Sheet : Reproduction in flowering plant and Economic Botany Eng. Page – 84

Entire collection of plants / seeds having all diverse alleles for all genes in a given crop is called as germplasm collection.

