

**PART - A (PHYSICS)**

**Total Number of Questions (32)**

1. If energy of electron in ground state is  $-13.6$  then find out speed of electron in fourth orbit of H-atom  
 (1)  $5.45 \times 10^6$  m/s      (2)  $5.45 \times 10^5$  m/s      (3)  $5.45 \times 10^4$  m/s      (4)  $4.45 \times 10^5$  m/s

**Ans. (2)**

**Sol.**  $V = 2.18 \times 10^6 \times \frac{Z}{n}$  m/s  
 $= 2.18 \times 10^6 \times \frac{1}{4} = 0.545 \times 10^6$  m/s  $= 5.45 \times 10^5$  m/s

2. In a LCR oscillatory circuit find the energy stored in inductor at resonance. If voltage of source is 10 V and resistance is  $10\Omega$  and inductance = 1H.

- (1) 0.5J      (2) 2 J      (3) 4 J      (4) 10 J

**Ans. (1)**

**Sol.** At resonance current

$$I = \frac{V}{Z_{\min}} = \frac{V}{R} = \frac{10}{10} = 1A$$

$$\text{Energy of inductor} = \frac{1}{2} LI^2 = \frac{1}{2} (1) (1)^2 = 0.5 J$$

3. 15 eV is given to  $e^-$  in 4<sup>th</sup> orbit then find it's final energy when it comes out of H-atom  
 (1) 14.15 eV      (2) 13.6 eV      (3) 12.08 eV      (4) 15.85

**Ans. (1)**

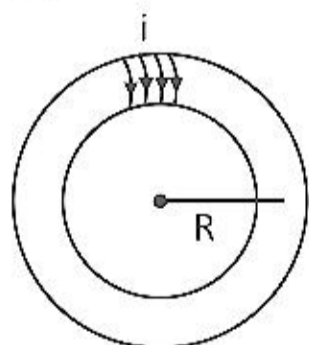
**Sol.** Energy of 4<sup>th</sup> orbit of H-atom  $= -13.6 \times \frac{1}{16} = -0.85$  eV

So energy release = total energy – ionization energy of 4<sup>th</sup> orbit  
 $= 15 - 0.85$   
 $= 14.15$

4. For a toroid N = 500, radius = 40 cm, and area of cross section =  $10 \text{ cm}^2$ . Find inductance

- (1) 125  $\mu\text{H}$       (2) 250  $\mu\text{H}$       (3) 0.00248 H      (4) zero

**Ans. (1)**



**Sol.**

If we flow a current i, then

$$B = \frac{\mu_0 Ni}{2\pi R}$$

$$\phi_{\text{self}} = (B \times A) \times N = \left( \frac{\mu_0 Ni}{2\pi R} \right) A \times N \Rightarrow \phi_{\text{self}} = \left( \frac{\mu_0 N^2 A}{2\pi R} \right) i \text{ and } \phi_{\text{self}} = Li$$

$$L = \frac{\mu_0 N^2 A}{2\pi R} = \frac{\mu_0}{4\pi} \frac{2N^2 A}{R} \Rightarrow L = (10^{-7}) \times \frac{2 \times (500)^2 \times 10 \times (10^{-2})^2}{0.4} = 125\mu\text{H}$$

5. Find BE per nucleon of  $^{56}\text{Fe}$  where  $m(^{56}\text{Fe}) = 55.936\text{u}$ ,  $m_n = 1.00727\text{u}$ ,  $m_p = 1.007274\text{u}$   
 (1) 477.45 MeV                      (2) 8.52 MeV                      (3) 577 MeV                      (4) 10.52 MeV

**Ans. (2)**

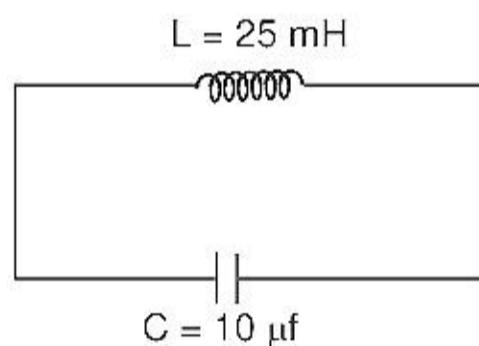
**Sol.**  $BE = [26 m_p + 30 m_n - m^{56}\text{Fe}]c^2$   
 $m_n = 1.00866\text{u}$   
 $m_p = 1.00727\text{u}$   
 $BE = [26 \times 1.00727 + 30 \times 1.00866 - 55.936] \times 931$   
 $= 0.51282 \times 931$   
 $= 477.435\text{ MeV}$   
 Binding energy per nucleon =  $\frac{477.435}{56}\text{ MeV} = 8.52\text{ MeV}$

6. A string wave equation is given  $y = 0.002 \sin(300t - 15x)$  and mass density is  $\left(\mu = \frac{0.1\text{kg}}{\text{m}}\right)$ . Then find the tension in the string  
 (1) 30N                      (2) 20 N                      (3) 40 N                      (4) 45 N

**Ans. (3)**

**Sol.** In string wave speed is  
 $V = \sqrt{\frac{T}{\mu}}$   
 $T = mV^2$   
 $T = .1 \times 20 \times 20 = 40\text{ N}$   
 $V = \frac{\omega}{k} = \frac{300}{15} = 20\text{ M/S}$

7. If maximum energy is stored in capacitor at  $t = 0$  then find the time after which current in the circuit will be maximum.



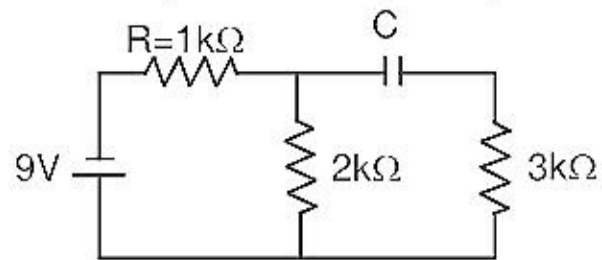
- (1)  $\frac{\pi}{2}\text{ ms}$                       (2)  $\frac{\pi}{4}\text{ ms}$                       (3)  $\pi\text{ ms}$                       (4) 2 ms

**Ans. (2)**

**Sol.** In L-C oscillation total time in one complete cycle.

$T = 2\pi\sqrt{LC}$   
 $T = 2\pi\sqrt{25 \times 10^{-3} \times 10 \times 10^{-6}}$   
 $T = 2\pi\sqrt{25 \times 10^{-8}}$   
 $T = 2\pi \times 5 \times 10^{-4}$   
 $T = \pi \times 10^{-3}\text{ sec}$   
 after time  $\frac{T}{4}$  capacitor is fully closed  
 then  $\frac{T}{4} = \frac{\pi \times 10^{-3}}{4} = \frac{\pi}{4}\text{ ms}$

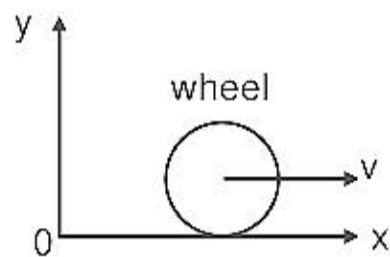
8. When capacitor is fully charged, find current drawn from the cell.



- (1) 2mA                      (2) 1 mA                      (3) 3 mA                      (4) 9 mA
- Ans. (3)**

**Sol.**  $I = \frac{9}{2+1} = 3\text{mA}$

9. Given  $V_{CM} = 2 \text{ m/s}$ ,  $m = 2 \text{ kg}$ ,  $R = 4 \text{ m}$



Find angular momentum of ring about origin if it is in pure rolling

- (1)  $32 \text{ kgm}^2/\text{s}$                       (2)  $24 \text{ kgm}^2/\text{s}$                       (3)  $16 \text{ kgm}^2/\text{s}$                       (4)  $8 \text{ kgm}^2/\text{s}$
- Ans. (1)**

**Sol.**  $\vec{L} = I_{CM} \cdot \omega + mV_{CM}r_1 d$

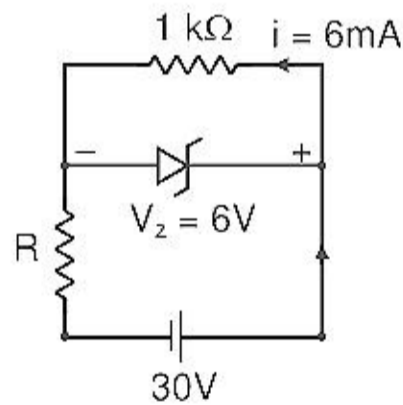
$$\omega = \frac{v}{R} = \frac{2}{4} = 0.5 \text{ rad/sec}$$

$$\vec{L} = MR^2 \cdot \omega + MV_{CM} \cdot R$$

$$= 2 \times 16 \times 0.5 + 2 \times 2 \times 4 = 16 + 16$$

$$\vec{L} = 32 \frac{\text{kg} \times \text{m}^2}{\text{s}}$$

10. If voltage across zener diode is 6V then find out value of maximum resistance in this condition.



- (1)  $2\text{k}\Omega$                       (2)  $2\text{k}\Omega$                       (3)  $5\text{k}\Omega$                       (4)  $4\text{k}\Omega$
- Ans. (4)**

**Sol.**  $i = \frac{30}{R+1} \text{ mA}$

$$\text{voltage across } 1 \text{ k}\Omega = \frac{30}{R+1} \cdot 1 = \frac{30}{R+1} = v_2$$

$$\frac{30}{R+1} = 6$$

$$30 = 6R + 6$$

$$24 = 6R \quad \Rightarrow \quad R = \frac{24}{6} = 4\text{k}\Omega$$



11. A transformer consists of 500 turn in primary coil and 10 turns in secondary coil with the load of  $10 \Omega$ . Find out current in the primary coil when the voltage across secondary coil is 50 V.  
 (1) 5A (2) 1A (3) 10A (4) 2A

Ans. (2)

Sol.

$$\frac{V_P}{V_S} = \frac{N_P}{N_S}$$

$$\frac{V_P}{50} = \frac{500}{10}$$

$$V_P = 2500$$

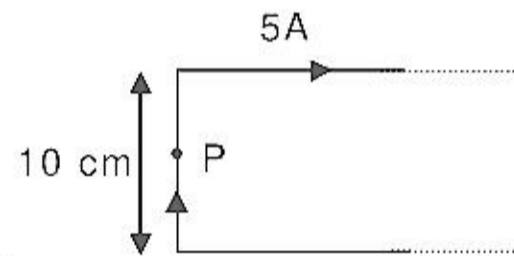
$$i_s = \frac{V_S}{R} = \frac{50}{10} = 5A$$

$$\frac{i_p}{i_s} = \frac{V_S}{V_P}$$

$$\frac{i_p}{5} = \frac{500}{2500}$$

$$i_p = \frac{1}{5} \times 5 = 1A$$

12. Find force per unit length at P.



- (1)  $10^{-4} \text{ m}$  (2)  $10^{-4} \text{ N/m}$  (3)  $3 \times 10^{-4} \text{ N/m}$  (4)  $0.3 \text{ N/m}$

Ans. (2)

Sol. Let length of wire element at P is  $dl$ .

Magnetic field at B,

$$B = \frac{\mu_0 i}{4\pi r} + 0 + \frac{\mu_0 i}{4\pi r}$$

$$B = \frac{\mu_0 \times 5}{4\pi \times 5 \times 10^{-2}} \times 2$$

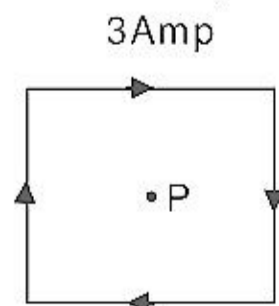
$$B = \frac{\mu_0}{4\pi} \times 200$$

$$B = 2 \times 10^{-5} \text{ T}$$

$$F = iBdl$$

$$\frac{F}{dl} = iB = 5 \times 2 \times 10^{-5} = 10^{-4} \text{ N/m}$$

13. Find magnetic field at centre P if length of side of square loop is 20 cm.



- (1)  $12\sqrt{2} \times 10^{-6} \text{ T}$  (2)  $12 \times 10^{-6} \text{ T}$  (3)  $6 \times 10^{-6} \text{ T}$  (4)  $6\sqrt{2} \times 10^{-6} \text{ T}$

Ans. (1)

Sol.  $B = \frac{\mu_0 i}{\pi r} 2\sqrt{2}$   
 $= \frac{4\pi \times 10^{-7} \times 3}{\pi \times 0.2} 2\sqrt{2}$   
 $= 120\sqrt{2} \times 10^{-7}$   
 $B = 12\sqrt{2} \times 10^{-6} \text{ T}$

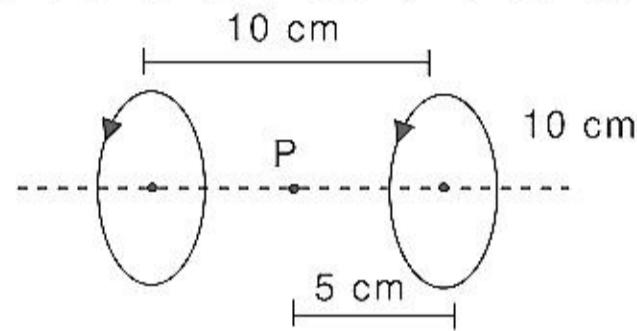
14. What is the dimension of Luminous flux :

- (1)  $[\text{cd}^1]$                       (2)  $[\text{cd}^1\text{T}^{-1}]$                       (3)  $[\text{cd}^1\text{L}^{-2}]$                       (4)  $[\text{cd}^1\text{L}^1\text{T}^{-1}]$

Ans. (1)

Sol. Dimension of Luminous flux is cd.

15. Two circular loops having same radius  $[R = 10 \text{ cm}]$  and same current  $\frac{7}{2} \text{ A}$  are placed along same axis as shown. If distance between their centre is 10 cm, find net magnetic field at of point P.



- (1)  $\frac{50\mu_0}{\sqrt{5}} \text{ T}$                       (2)  $\frac{28\mu_0}{\sqrt{5}} \text{ T}$                       (3)  $\frac{56\mu_0}{\sqrt{5}} \text{ T}$                       (4)  $\frac{56\mu_0}{\sqrt{3}} \text{ T}$

Ans. (3)

Sol. At point P, magnetic field will be in same direction by both coils.

$$B = B_1 + B_2 \quad \text{and} \quad B_1 = B_2$$

$$B = \frac{\mu_0 i r^2}{2(r^2 + n^2)^{3/2}} \times 2$$

$$B = \frac{\mu_0 i r^2}{(r^2 + n^2)^{3/2}}$$

$$B = \frac{\mu_0 \times \frac{7}{2} \times (0.1)^2}{[(0.1)^2 + (0.05)^2]^{3/2}} = \frac{56\mu_0}{\sqrt{5}} \text{ T}$$

16. If half life of an element is 69.3 hours then how much of its percent will decay in 10<sup>th</sup> to 11<sup>th</sup> hours.

Initial activity = 50  $\mu\text{Ci}$

- (1) 1%                      (2) 2%                      (3) 3%                      (4) 4%

Ans. (1)

Sol. Let active Nuclei at  $t = 0$  is  $N_0$  then,

Active nuclei at  $t = 10$  hour

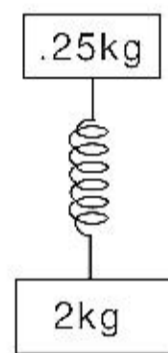
$$N_1 = N_0 e^{-10\lambda}$$

Active nuclei at  $t = 11$  hour

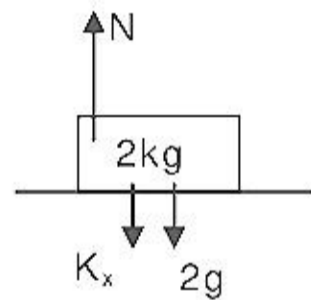
$$N_2 = N_0 e^{-11\lambda}$$

$$\begin{aligned} \% \text{ decay} &= \left( \frac{N_1 - N_2}{N_1} \right) \times 100 \\ &= \left( \frac{N_0 \cdot e^{-10\lambda} - N_0 e^{-11\lambda}}{N_1} \right) \times 100 \\ &= \left( \frac{N_0 \cdot e^{-10\lambda} - N_0 e^{-11\lambda}}{N_0 e^{-10\lambda}} \right) \times 100 \\ &= \left( 1 - \frac{1}{e^\lambda} \right) \times 100 \\ &= \left( 1 - \frac{1}{e^{\ln 2 / T_{1/2}}} \right) \times 100 \\ T_{1/2} &= 69.3 \text{ hrs.} \\ &= \left( 1 - \frac{1}{e^{0.01}} \right) \times 100 \\ \% \text{ decay} &= 1\% \quad \text{Ans.} \end{aligned}$$

17. Initially spring in its natural length now a block at mass 0.25 kg is released than find out maximum force by system on floor?



- Ans. (1) 15 N                      (2) 20 N                      (3) 25 N                      (4) 30 N



Sol.

Work – energy theory on (25)kg

$$\frac{1}{2} Kx^2 = mgx$$

$$Kx = 2mg$$

$$Kx = 2 \times .25 \times 10$$

$$= 5\text{N}$$

$$= 25 \text{ N}$$

$$N = kx + 2g$$

$$= 5 + 20 = 25 \text{ N}$$

18. If 7 gm  $N_2$  is mixed with 20 gm Ar, there  $C_p/C_v$  of mixture will be :

- (1)  $\frac{17}{6}$                       (2)  $\frac{11}{7}$                       (3)  $\frac{17}{11}$                       (4)  $\frac{17}{13}$

Ans. (3)

**Sol.** For  $N_2$ ,  $f = 5$   
For  $Ar$ ,  $f = 3$

$$\text{For } N_2, C_V = \frac{5}{2}R, \quad C_P = \frac{7}{2}R, \quad \text{moles} = \frac{1}{4}$$

$$\text{Ar, } C_V = \frac{3}{2}R, \quad C_P = \frac{5}{2}R, \quad \text{moles} = \frac{1}{2}$$

$$C_{P_{mix}} = \frac{n_1 C_{P_1} + n_2 C_{P_2}}{n_1 + n_2}$$

$$= \frac{\frac{1}{4} \times \frac{7}{2}R + \frac{1}{2} \times \frac{5}{2}R}{\frac{1}{4} + \frac{1}{2}} = \frac{\frac{7}{8}R + \frac{5}{4}R}{\frac{3}{4}} = \frac{17R}{8} \times \frac{4}{3} = \frac{17R}{6}$$

$$C_{V_{mix}} = \frac{n_1 C_{V_1} + n_2 C_{V_2}}{n_1 + n_2} = \frac{\frac{1}{4} \times \frac{5}{2}R + \frac{1}{2} \times \frac{3}{2}R}{\frac{1}{4} + \frac{1}{2}}$$

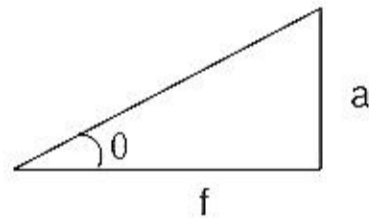
$$= \frac{11R}{8} \times \frac{4}{3} = \frac{11R}{6}$$

$$Y_{mix} = \frac{C_{P_{mix}}}{C_{V_{mix}}} = \frac{17}{11} \quad \text{Ans.}$$

19. If  $f_0 = 5 \text{ cm}$ ,  $\lambda = 6000 \text{ \AA}$ ,  $a = 1 \text{ cm}$  for a microscope, then what will be its resolving power.  
(1)  $11.9 \times 10^5/m$       (2)  $10.9 \times 10^5/m$       (3)  $10.9 \times 10^4/m$       (4)  $10.9 \times 10^3/m$

**Ans.** (2)

**Sol.**  $R.P = \frac{2\mu \sin\theta}{1.22\lambda}$



$$\mu = 1$$

$$\tan\theta \simeq \sin\theta = \frac{a}{f} = \frac{1}{5} = 0.2 \quad \Rightarrow \quad R.D. = \frac{2 \times 1 \times 0.2}{1.22 \times 6 \times 10^{-7}} = \frac{4 \times 10^6}{3.66}$$

$$R.P. = 10.9 \times 10^5/m$$

20. Distance of 5<sup>th</sup> dark fringe from centre is 4 mm. If  $D = 2 \text{ m}$ ,  $\lambda = 600 \text{ nm}$ , then distance between slits is :  
(1) 1.35 mm      (2) 2.00 mm      (3) 3.25 mm      (4) 10.35 mm

**Ans.** (1)

**Sol.** Distance of 5<sup>th</sup> dark

$$\text{Fringe from centre} = \frac{9\beta}{2}$$

$$\frac{9 \times \lambda \times D}{2 \times d} = 4 \times 10^{-3} \quad \Rightarrow \quad d = \frac{9 \times 6 \times 10^{-7} \times 2}{2 \times 4 \times 10^{-3}} = 1.35 \text{ mm}$$

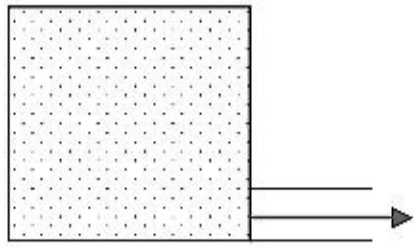


21. A conducting and closed container of capacity 100 liter contains an ideal gas at a high pressure. Now using a pump, the gas is taken out at a constant rate of 5 liter/sec. Find the time taken in which the pressure will decrease to  $\frac{P_{\text{initial}}}{100}$ ? (Assume isothermal condition)

(1) 46 sec                      (2) 92 sec                      (3) 118 sec                      (4) 146 sec

Ans. (2)

Sol.



The gas is taken out at the rate of 5 lit/sec. The volume of gas ejected in 'dt' time is  $d(\text{vol}) = 5 dt$

$$\text{Moles of gas ejected} = \frac{n}{V}(5dt)$$

$$PV = nRT \quad \Rightarrow \quad (dp)V = (dn) RT \quad \Rightarrow \quad (dp)V = -\left(\frac{n}{V}5dt\right)RT$$

$$\Rightarrow \quad (dp)V = -5dt \frac{nRT}{V} = -(5dt)P$$

$$\Rightarrow \quad \frac{dp}{p} = \frac{5}{V}dt \quad \Rightarrow \quad \frac{dp}{p} = -\frac{5}{100}dt = -\frac{1}{20}dt$$

$$\int_{p=p_i}^{p=p_f} \frac{dp}{p} = -\frac{1}{20} \int_{t=0}^{t=t} dt \quad \Rightarrow \quad p_i = p_f e^{-\frac{t}{20}} \quad \Rightarrow \quad \frac{p_i}{100} = p_i e^{-\frac{t}{20}}$$

$$T = 20 \ln 100 = 20 \times 2 \ln 10 = 92 \text{ sec.}$$

22. How can we change a camera from F/4 to F/5.6?

- (1) Increase the aperture to 2 time keeping the focal distance constant.  
 (2) Increase the aperture to  $\sqrt{2}$  time keeping the focal distance constant.  
 (3) Increase the aperture to  $\frac{1}{2}$  time keeping the focal distance constant.  
 (4) Increase the aperture to  $\frac{1}{\sqrt{2}}$  time keeping the focal distance constant.

Ans. (4)

Sol. F-number of a camera =  $\frac{f}{\text{diameter of aperture}}$

For F/4 camera, F number is 4, so

$$4 = \frac{f}{D_1}$$

For F/5.6 camera, F number is 5.6, so

$$5.6 = \frac{f}{D_2} \quad \Rightarrow \quad \frac{D_2}{D_1} = \frac{4}{5.6} = \frac{1}{\sqrt{2}} \Rightarrow D_2 = \frac{D_1}{\sqrt{2}}$$

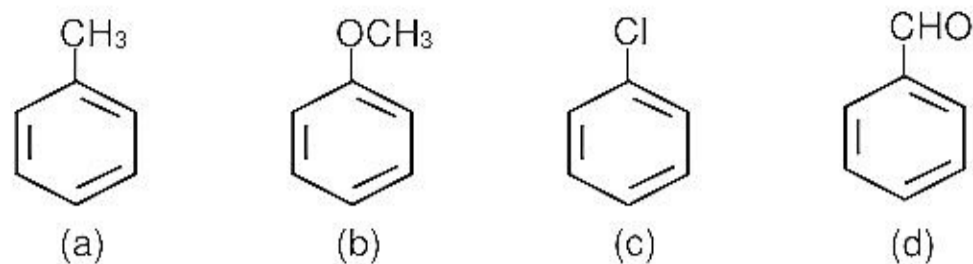


23. Force on current carrying loop (Radius = R) in uniform magnetic (B) field which is at an angle  $30^\circ$  with the normal will be :-  
 (1) zero                      (2)  $2\pi Ri B$                       (3)  $2\sqrt{3} \pi Ri B$                       (4)  $\pi Ri B$   
**Ans.** (1)  
**Sol.** Force on current carrying loop in uniform magnetic field is always zero.
24. **Assertion :** Sometimes insects can walk on water.  
**Reason :** The gravitational force on insect is balanced by force due surface tension.  
**Ans.** (1)
25. **Assertion: Incoming** light reflected by earth is partially polarized.  
**Reason:** Atmospheric particle polarize the light.  
**Ans.** (1)
26. **Assertion :** Photodiode and solar cell work on same mechanism.  
**Reason :** Area is large for solar cell.  
**Ans.** (2)
27. **Assertion :**  ${}^3_1\text{H}$  isotope does not undergo fusion of the type  ${}^3_1\text{H} + {}^2_1\text{H} \rightarrow$  as it is rarely found in nature.  
**Reason :**  ${}^3_1\text{H}$  has half life of  $\approx 12$  years.  
**Ans.** (2)
28. **Assertion :** Macro properties of gas are affected with increase in height.  
**Reason :** These properties of gases depend on thermodynamic parameters.  
**Ans.** (4)
29. **Assertion :**  $V_{\text{rms}}$  and  $V_{\text{mean}}$  of gaseous molecules is nearly of the order of velocity of sound.  
**Reason :** The sound travels in air because of vibrational molecular motion.  
**Ans.** (2)
30. **Assertion :** The kinetic energy does not change when a particle moves in uniform magnetic field.  
**Reason :** The velocity of the particle is not affected by magnetic field.  
**Ans.** (1)
31. **Assertion :** For revolving electron, direction of angular momentum and magnetic moment are opposite.  
**Reason :** Charge of electron is negative.  
**Ans.** (1)
32. **Assertion :** A metallic surface is moved in and out in magnetic field then emf is induced in it.  
**Reason :** Eddy current will be produced in a metallic surface moving in and out of magnetic field.  
**Ans.** (1)

PART - B (CHEMISTRY)

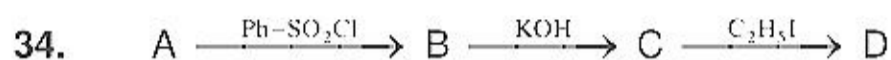
Total Number of Questions (49)

33. Correct order of electrophilic substitution reaction is :



- (1)  $a > b > c > d$       (2)  $d > b > a > c$       (3)  $b > a > c > d$       (4)  $b > a > d > c$

Ans. (3)

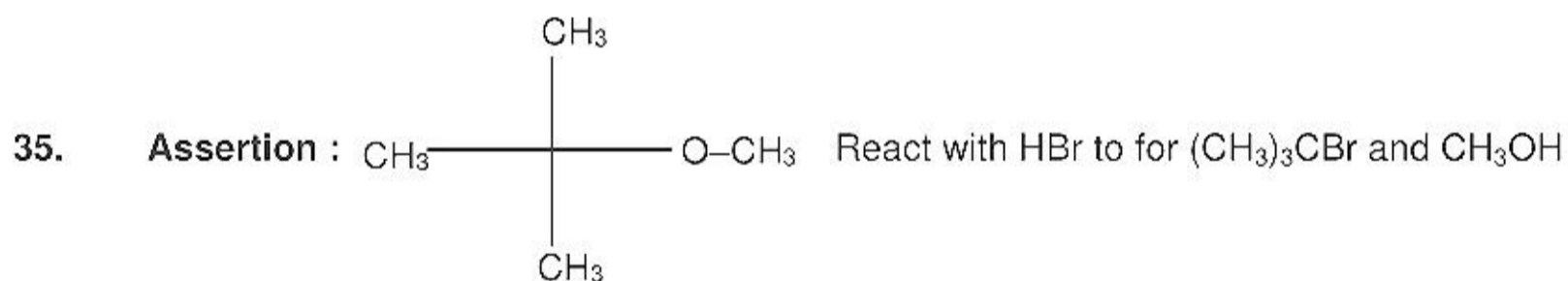


'C' is water soluble

Correct structure of A and D are

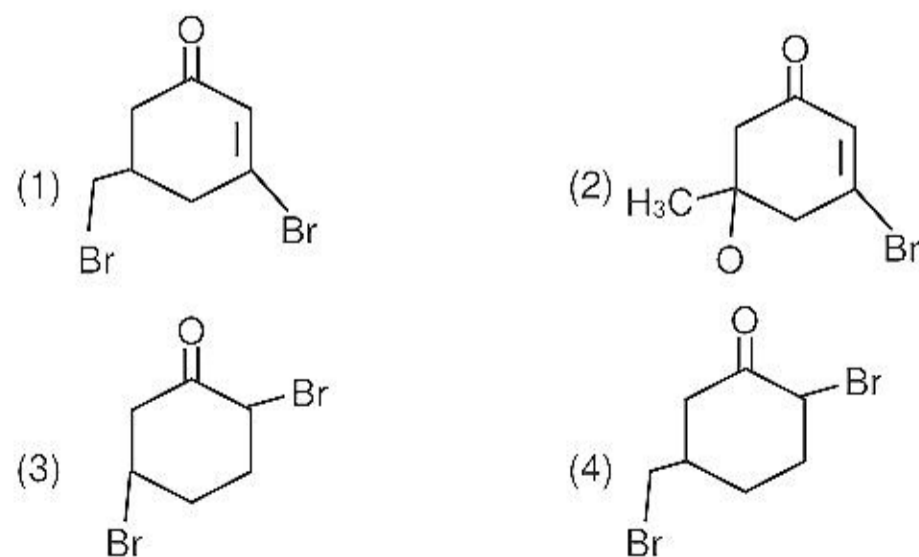
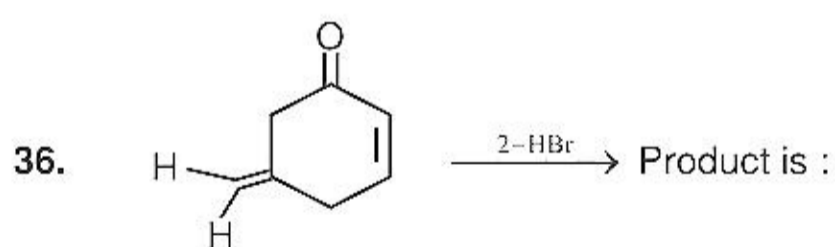
- (1)  $\text{R-NH}_2$  ,  $\text{Ph-SO}_2\text{-NR-(C}_2\text{H}_5)_2^+\text{I}^-$   
 (2)  $\text{R-NH-R}$  ,  $\text{Ph-SO}_2\text{-NR}_2\text{-C}_2\text{H}_5$   
 (3)  $\text{R-NH}_2$  ,  $\text{Ph-SO}_2\text{-NR-I}$   
 (4)  $\text{R}_2\text{NH}$  ,  $\text{Ph-SO}_2\text{-NR}_2\text{-(C}_2\text{H}_5)^+\text{I}^-$

Ans. (1)



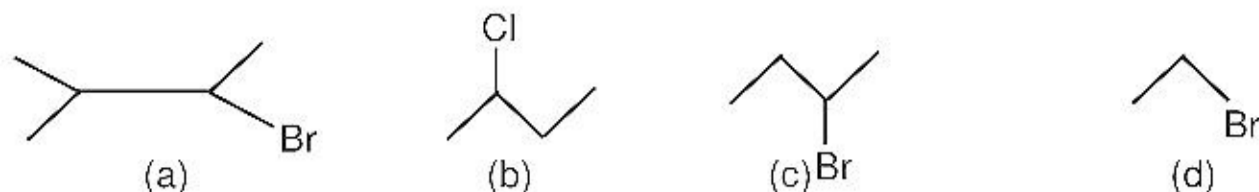
**Reason :** It follows  $\text{S}_{\text{N}}1$  mechanism

Ans. (1)



Ans. (2)

37. Correct order for reaction with alcoholic KOH



- (1)  $a > b > c > d$       (2)  $a > c > b > d$       (3)  $d > b > c > a$       (4)  $a > d > b > c$

Ans. (2)

38.  $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H} + \text{CH}_3-\text{CH}=\text{O} \xrightarrow{\text{Conc. NaOH}}$  Find out the products of reaction

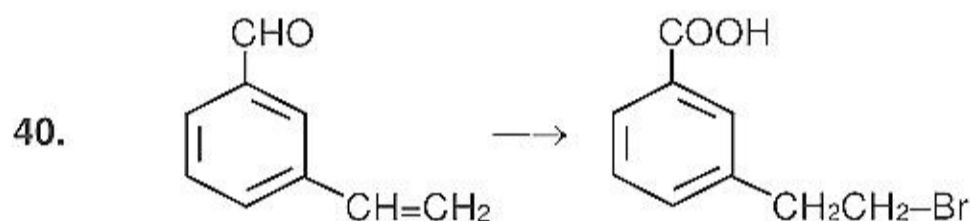
- (1)  $\text{CH}_3\text{CO}_2\text{Na}$  &  $\text{CH}_3\text{OH}$       (2)  $\text{CH}_3\text{CH}_2\text{OH}$  +  $\text{CH}_3\text{OH}$   
 (3)  $\text{CH}_3\text{CH}_2\text{OH}$  &  $\text{HCO}_2\text{Na}$       (4)  $\text{CH}_3\text{CO}_2\text{Na}$  +  $\text{HCO}_2\text{Na}$

Ans. (3)

39. (i)  $\text{F}_3\text{C}-\text{COOH}$ , (ii)  $\text{CH}_3\text{COOH}$ , (iii)  $\text{C}_6\text{H}_5\text{COOH}$ , (iv)  $\text{CH}_3\text{CH}_2\text{COOH}$   
 Correct order of  $\text{pK}_a$  value is :

- (1)  $1 > 3 > 2 > 4$       (2)  $4 > 2 > 3 > 1$   
 (3)  $4 > 3 > 2 > 1$       (4)  $1 > 2 > 4 > 3$

Ans. (2)



Suitable reagent for following conversion

- (1)  $\text{CH}_3\text{MgBr}$ ,  $\text{H}_3\text{O}^+$ ,  $\text{I}_2/\text{NaOH}$ ,  $\text{H}-\text{Br}/\text{R}_2\text{O}_2$   
 (2)  $\text{KMnO}_4/\text{NaOH}$ ,  $\text{HBr}/\text{R}_2\text{O}_2$   
 (3)  $\text{CH}_3\text{MgBr}$ ,  $\text{KMnO}_4$ ,  $\text{HBr}$   
 (4)  $\text{CH}_3\text{MgBr}$ ,  $\text{H}_3\text{O}^+$ ,  $\text{H}-\text{Br}$ ,  $\text{I}_2/\text{NaOH}$

Ans. (1)

41. **Assertion** : Two sugar units joined by 1,2-glycosidic bond in sucralose.

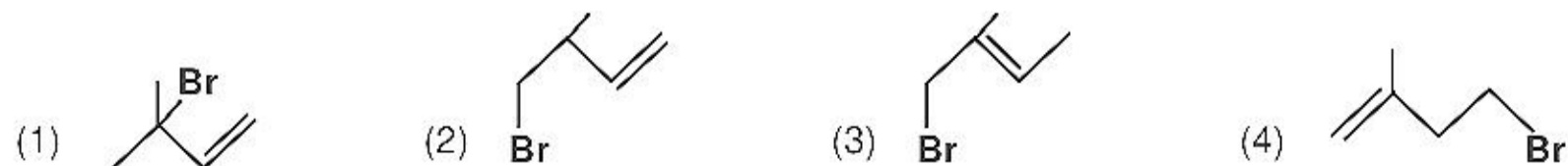
**Reason** : It contains  $\text{C}_1$ -glucose and  $\text{C}_2$ -fructose glycosidic bond

Ans. (1)

42. **Assertion** : Hydroquinone is more acidic than resorcinol.

**Reason** : OH shows  $-\text{I}$  effect

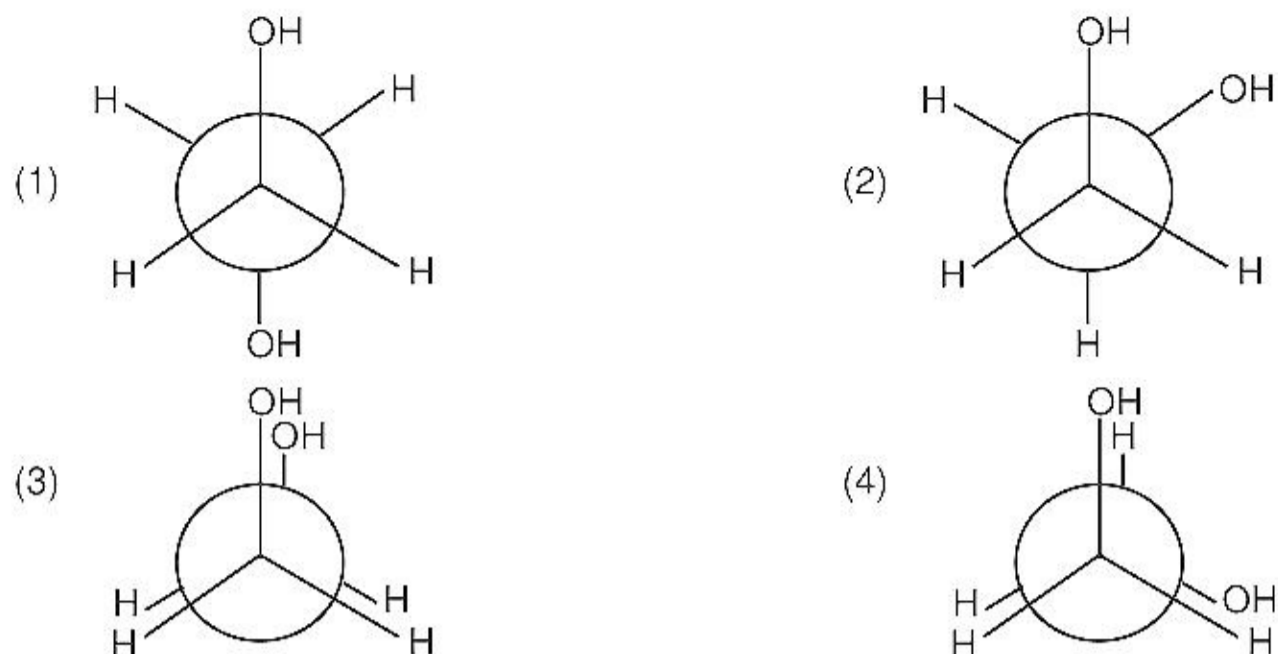
Ans. (4)



Ans. (1)



44. Which is most stable conformer of ethan-1,2-diol



Ans. (2)

45. **Assertion :** Tert. Butyl amine can be formed by Gabriel phthalimide synthesis

**Reason :** It follow  $S_N1$  mechanism

Ans. (4)

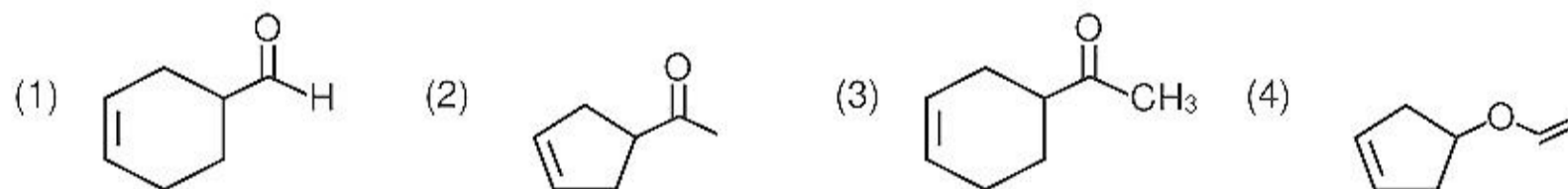
46. (1)  $\text{C}_6\text{H}_5-\overset{\text{O}}{\parallel}{\text{C}}-\text{C}_6\text{H}_5$   
 (2)  $\text{C}_6\text{H}_5-\text{CHO}$   
 (3)  $p\text{-CH}_3\text{-C}_6\text{H}_4\text{-CHO}$   
 (4)  $p\text{-CH}_3\text{O-C}_6\text{H}_4\text{-CHO}$

Correct order for nucleophilic addition reaction :

- (1)  $2 > 1 > 3 > 4$       (2)  $4 > 3 > 2 > 1$       (3)  $2 > 3 > 4 > 1$       (4)  $4 > 2 > 3 > 1$

Ans. (3)

47.  $\text{C}_7\text{H}_{10}\text{O}$  reacts with  $\text{CH}_3\text{MgBr}$  to give a compound  $\text{C}_8\text{H}_{10}\text{O}$  which gives the test with iodoform, than fine out structure of A



Ans. (1)

48. **Column - I**

(A) Tyrosine

(B) Serin

(C) Tryptophane

(D) Proline

**Column - II**

(P) Essential amino acid

(Q) Ceric Ammonium Nitrate

(R) Neutral  $\text{FeCl}_3$

(S) Carbylamine Test - Negative

Select the correct set of answer:

(1) A - R, B - Q, C - P, D - S

(3) A - R, B - P, C - Q, D - S

(2) A - Q, B - R, C - S, D - P

(4) A - S, B - Q, C - P, D - R

Ans. (1)

49. **Assertion** : For liquid dishwashing non-ionic type of detergent are used:

**Reason** : Remove greese and oil by micelle formation.

**Ans.** (1)

50. **Assertion** : Tertbutyl methyl ether React with HBr to form tert. butyl  $(\text{CH}_3)_3\text{C-Br}$  and  $\text{CH}_3\text{-OH}$  methonal

**Reason** : It follows  $\text{SN}_1$  mechanism.

**Ans.** (1)

51. Which will release  $\text{NH}_3$  on Reaction with  $\text{NaOH}$ .

(1) Hydrazoic acid ( $\text{N}_3\text{H}$ )

(2) ethylene diamine tetra acetic acid.

(3)  $\text{NH}_2\text{-OH}$

(4) Triethylamine

**Ans.** (1)

52. **Assertion** : Ferromagnetic compound is more attracted in mwagnetic field.

**Reason** : Because all electron are alligned in same direction.

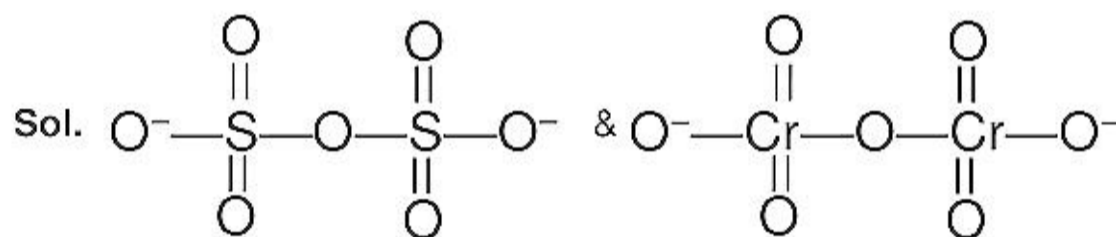
**Ans.** (3)

**Sol.** Ferromagnetic compound is more attracted in magnetic field due to all electron are alligned in same direction

53. **Assertion** :  $\text{S}_2\text{O}_7^{2-}$  &  $\text{Cr}_2\text{O}_7^{2-}$  both exist.

**Reason** : Both have same valence electrons.

**Ans.** (1)



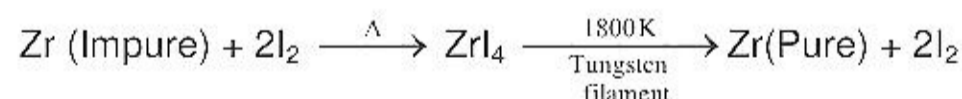
Both having same structure and same valance electrons

54. **Assertion** :  $\text{ZrI}_4$  is useful in purification of Zirconium ( $\text{Zr}$ )

**Reason** :  $\text{ZrI}_4$  sublimise at room temperature.

**Ans.** (3)

**Sol.** Van-Arkel process



55.  $\text{MnO}$  is :

(1) Ferromagnetic

(2) Antiferromagnetic

(3) Ferrimagnetic

(4) Dimagnetic

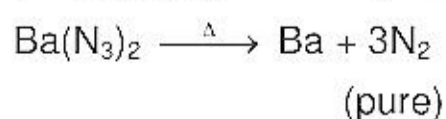
**Ans.** (2)

56. **Assertion** : Pure  $\text{N}_2$  is obtained from  $\text{Ba}(\text{N}_3)_2$  but not from  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$

**Reason** : On decomposition  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  gives  $\text{O}_2$  gas.

**Ans.** (3)

**Sol.**  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \longrightarrow \text{N}_2 + \text{Cr}_2\text{O}_3 + 4\text{H}_2\text{O}$



57. Which have melting point below 500°C

- (1) Ag, Cu                      (2) Zn, Cd                      (3) Cd, Cu                      (4) Ag, Zn

Ans. (2)

Sol. Zn(146°C), Cd (321°C) has very low m.p. due to low heat of atomization and weak metallic bond.

58. Strong oxidizing agent used in purification of water

- (1) Cl<sub>2</sub>O                      (2) NO<sub>3</sub><sup>-</sup>                      (3) NO<sub>2</sub><sup>-</sup>                      (4) OF<sub>2</sub>

Ans. (1)

Sol. Cl<sub>2</sub>O is a good oxidizing agent and used to purify water

59. Which give colored carbonate precipitate?

- (1) Hg<sub>2</sub><sup>2+</sup>                      (2) Sr<sup>2+</sup>                      (3) Bi<sup>3+</sup>                      (4) Li<sup>+</sup>

Ans. (3)

Sol. Carbonate of Bi<sup>3+</sup> is pale yellow colored, other carbonates of Hg<sub>2</sub><sup>2+</sup>, Sr<sup>2+</sup> & Li<sup>+</sup> are colorless

60. Yellow color of chlorine water fades because of

- (1) Form HCl & HOCl                      (2) Chlorine gas escapes  
(3) ClO<sub>2</sub> + H<sub>2</sub>                      (4) Cl<sub>2</sub>O

Ans. (1)

Sol. Cl<sub>2</sub> + H<sub>2</sub>O → HCl + HOCl ;

HOCl → HCl + [O] (nascent oxygen responsible for bleaching action)

61. Which has least covalent radius.

- (1) Mn                      (2) Cu                      (3) Zn                      (4) Ni

Ans. (4)

Sol. Covalent radius in pm

Ni	<	Cu	<	Zn	=	Mn
125		128		137		137

62. Which is least soluble

- (1) Na<sub>2</sub>S                      (2) MgS                      (3) MgCl<sub>2</sub>                      (4) NaCl

Ans. (2)

Sol. MgS is more covalent so it is least soluble

63. Which of the following reacts most slowly with nitric acid.

- (1) Phosphorus                      (2) Chlorine                      (3) Sulphur                      (4) Iodine

Ans. (2)

64. In processing of steel which of the following allotropes of carbon is used.

- (1) Carbon black                      (2) Charcoal                      (3) Coke                      (4) Graphones

Ans. (3)

Sol. Coke is used in processing of steel



65. **Assertion** ;  $d^5$  configuration is more stable than  $d^4$   
**Reason** :  $d^5$  has more exchange energy as compared to  $d^4$  because 10 & 6 exchanges are possible in  $d^5$  &  $d^4$  respectively.
- Ans.** (1)
- Sol.**  $d^5$  configuration having more symmetry and exchange energy in comparison of  $d^4$  configuration.
66. Which of the following is incorrect about cyanogen gas?  
 (1) It has bent structure  
 (2) It is pseudohalogen.  
 (3) Its behavior is similar to halides.  
 (4) both carbon are  $sp$  hybridised
- Ans.** (1)
- Sol.** cyanogen gas  $(CN)_2$  is  $sp$  hybridised having linear geometry.  
 $N \equiv C - C \equiv N$
67. **Assertion:**  $I_2O_5$  is used to detect CO.  
**Reason** : In  $I_2O_5$  the oxidation number of I is 5.
- Ans.** (2)
- Sol.**  $I_2O_5 + 5CO \longrightarrow I_2 + 5CO_2$   
 $I_2 + 2Na_2S_2O_3 \longrightarrow Na_2S_4O_6 + 2NaI$
68. Which of the following complex is optically inactive  
 (1)  $[RhCl(CO)(PPh_3)(NH_3)]$   
 (2)  $[Fe(C_2O_4)_3]^{3-}$   
 (3)  $[Fe(en)_2Cl_2]$   
 (4)  $[Pd(en)_2Cl_2]$
- Ans.** (1)
- Sol.**  $[RhCl(CO)(PPh_3)(NH_3)]$  is inactive as it is square planer complex.
69. Correct increasing order for the wavelength of absorption in the visible region for the complexes of  $Co^{3+}$  is:  
 (1)  $[Co(CN)_6]^{3-}$ ,  $[Co(NH_3)_6]^{3+}$ ,  $[Co(NH_3)_5(H_2O)]^{3+}$ ,  $[Co(NH_3)_5Cl]^{2+}$   
 (2)  $[Co(CN)_6]^{3-}$ ,  $[Co(NH_3)_5(H_2O)]^{3+}$ ,  $[Co(NH_3)_5Cl]^{2+}$ ,  $[Co(NH_3)_6]^{3+}$ ,  
 (3)  $[Co(NH_3)_6]^{3+}$ ,  $[Co(CN)_6]^{3-}$ ,  $[Co(NH_3)_5(H_2O)]^{3+}$ ,  $[Co(NH_3)_5Cl]^{2+}$   
 (4)  $[Co(NH_3)_5Cl]^{2+}$ ,  $[Co(NH_3)_5(H_2O)]^{3+}$ ,  $[Co(NH_3)_6]^{3+}$ ,  $[Co(CN)_6]^{3-}$
- Ans.** (1)
- Sol.** Strength of ligands attached with  $Co^{3+}$  ion is in the order of  $CN^- > NH_3 > H_2O > Cl^-$ . So order of splitting (value of  $\Delta_0$ ) will be in the same order.  
 $\therefore$  Wave length absorbing light  $\propto \frac{1}{\Delta_0}$

70.  $C + O_2(g) \longrightarrow CO_2$  ..... (i);  $\Delta H = -393 \text{ kJ mol}^{-1}$   
 $H_2 + 1/2 O_2 \longrightarrow H_2O$ , ..... (ii)  $\Delta H = -287.3 \text{ kJ mole}^{-1}$   
 $2CO_2 + 3H_2O \longrightarrow C_2H_5OH + 3O_2$  ..... (iii)  $\Delta H = 1366.8 \text{ kJ mol}^{-1}$   
 Find the standard enthalpy of formation of  $C_2H_5OH(l)$   
 (1)  $281.1 \text{ kJ mol}^{-1}$  (2)  $-281.1 \text{ kJ mol}^{-1}$   
 (3)  $562.2 \text{ kJ mol}^{-1}$  (4)  $-562.2 \text{ kJ mol}^{-1}$

**Ans.** (2)

**Sol.** Formation of  $C_2H_5OH$  :  
 $2C + 3H_2 + 1/2O_2 \longrightarrow C_2H_5OH$   
 eq (1)  $\times$  (2) + eq(2)  $\times$  (3) + eq.(3)  
 $2C + 2O_2 \longrightarrow 2CO_2$   
 $3H_2 + 3/2O_2 \longrightarrow 3H_2O$   
 $3CO_2 + 3H_2O \longrightarrow 3C_2H_5OH + 3O_2$   
 $3C + 3H_2 + 1/2O_2 \longrightarrow C_2H_5OH + 3O_2$   
 $= -394 \times 2 - 289.3 \times 3 + 1366.8$   
 $= -281.1 \text{ kJ/mole}$

71. If Boiling point of water is  $100^\circ\text{C}$ . How much gram of NaCl is added in 500 g of water to increase its boiling point of water by approx  $1^\circ\text{C}$ .  $(K_b)_{H_2O} = 0.52 \text{ K x kg/mole}$ .

- (1) 2.812 g (2) 28.12 g (3) 14.06 g (4) 7.03 g

**Ans.** (2)

**Sol.**  $\Delta T_b = i k_b m$

$$1 = 2 \times 0.52 \times \frac{w}{58.5} \times \frac{1000}{500}$$

$$w = 28.125 \text{ g}$$

72. In isolated system, find the condition for spontaneous reaction:

- (1)  $\Delta U = 0, \Delta S = 0, \Delta G = 0$  (2)  $\Delta U < 0, \Delta S > 0, \Delta G < 0$   
 (3)  $\Delta U = 0, \Delta S > 0, \Delta G < 0$  (4)  $\Delta U < 0, \Delta S < 0, \Delta G < 0$

**Ans.** (3)

73. A bulb is emitted electromagnetic radiation of 660 nm wave length. The Total energy of radiation is  $3 \times 10^{-18} \text{ J}$  The number of emitted photon will be : ( $h = 6.6 \times 10^{-34} \text{ J}\cdot\text{s}$ ,  $C = 3 \times 10^8 \text{ m/s}$ )

- (1) 1 (2) 10 (3) 100 (4) 1000

**Ans.** (2)

**Sol.** Number of photons = n

$$E = \frac{hc}{\lambda}$$

$$3 \times 10^{-18} = \frac{6.6 \times 10^{-34} \times 3 \times 10^8 \times n}{660 \times 10^{-9}}$$

$$n = \frac{30}{3} = 10$$



74. At 298 K temperature, 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 potential of electrode would be?

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

Ans. (1)

Sol.  $H_2 \longrightarrow 2H^+ + 2e^-$   
 1 atm       $10^{-10}$

$$E_{H_2/H^+} = 0 - \frac{0.059}{2} \log \frac{(10^{-10})^2}{1}$$

$$E_{H_2/H^+} = +0.59 \text{ V}$$

75. The decomposition of  $NH_3$  on Pt surface is a zero order reaction. If the value of rate constant is  $2 \times 10^{-4}$  mole liter $^{-1}$  sec $^{-1}$ . The rate of appearance of  $N_2$  and  $H_2$  are respectively:

- | $N_2$  | $H_2$  |
|--|--|
| (1) $1 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ | $3 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ |
| (2) $3 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ | $1 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ |
| (3) $2 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ | $6 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ |
| (4) $3 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ | $3 \times 10^{-4}$ mol l $^{-1}$ sec $^{-1}$ |

Ans. (3)

76. **Assertion:** Some salts are sparingly soluble at room temperature.

**Reason :** The entropy increases on dissolving the salts.

Ans. (2)

77. What is the activation energy (KJ/mol) for a reaction if its rate constant doubles when the temperature is raised from 300 K to 400 K ? ( $R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$ )

- (1) 68.8                      (2) 6.88                      (3) 34.4                      (4) 3.44

Ans. (2)

Sol.  $\log \frac{K_2}{K_1} = \frac{E_a}{2.3R} \left( \frac{1}{T_1} - \frac{1}{T_2} \right)$

$$\log \frac{2}{1} = \frac{E_a}{2.33 \times 8.31} \left( \frac{1}{300} - \frac{1}{400} \right)$$

$$= 0.3 \times 2.3 \times 8.31 \times 3 \times 400 = E_a$$

$$E_a = 6.88 \text{ kJ}$$

78. When 0.05 M dimethyl amine is dissolved in 0.1 M NaOH solution then the percentage dissociation of dimethyl amine is :  $(K_b)_{(CH_3)_2NH} = 5 \times 10^{-4}$

- (1)  $5 \times 10^{-5}$                       (2)  $5 \times 10^{-3}$                       (3)  $5 \times 10^{-1}$                       (4)  $5 \times 10^{-2}$

Ans. (3)

Sol. 0.05 M dimethyl amine (weak base),  $K_b = 5 \times 10^{-4}$   
 0.1 M NaOH

$$[OH^-] = 0.1 + 0.05 \alpha \approx 0.1$$

$$K_b = \frac{[C\alpha][OH^-]}{[C - C\alpha]} \quad 5 \times 10^{-4} = \frac{\alpha \times 0.1}{1 - \alpha} \quad \alpha = 5 \times 10^{-1} \%$$



79. **Assertion:** A spherical water drops become flatter surface.

**Reason :** It become flat due to gravity.

**Ans.** (1)

80. A chemical reaction :  $A + B \longrightarrow AB$ , B is acting as limiting reagent then choose the correct option.

The limiting reagent is :

- | A            | B        |
|--------------|----------|
| (1) 50 atom  | 100 atom |
| (2) 100 atom | 200 atom |
| (3) 50 atom  | 30 atom  |
| (4) 50 atom  | 200 atom |

**Ans.** (3)

81. Which of the following can react with  $K_2Cr_2O_7$

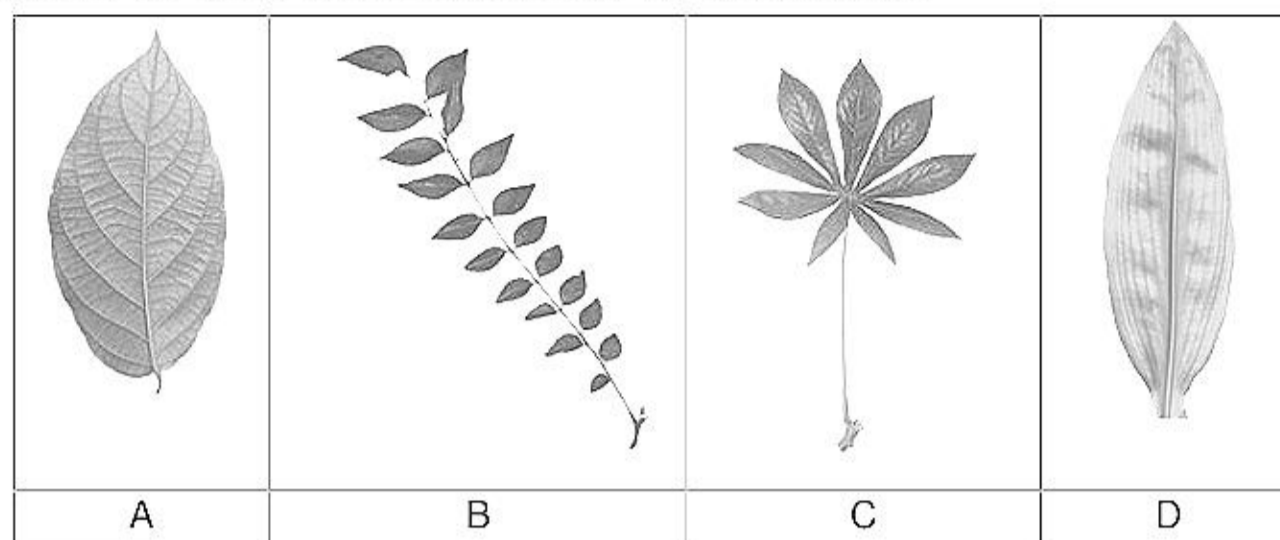
- (1)  $SO_3^{2-}$                       (2)  $CO_3^{2-}$                       (3)  $SO_4^{2-}$                       (4)  $NO_3^-$

**Ans.** (1)

**PART - C (BIOLOGY)**

Total Number of Questions (47)

82. Identify the given diagrams and mark the correct option-



- (1) A, D are compound while B, C are simple leaves
- (2) A, D are simple while B, C are compound leaves
- (3) A, B are simple while C, D are compound leaves
- (4) A, B are compound while C, D are simple leaves

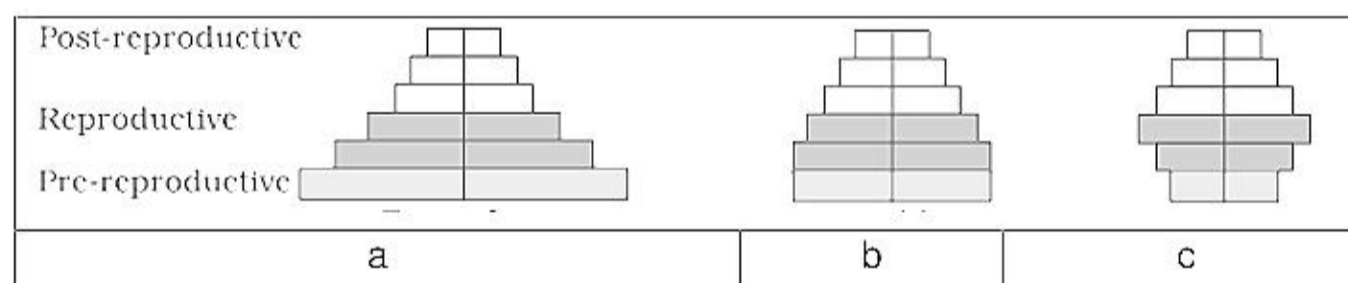
Ans (2)

83. Which of the following are plant growth promoters

- (1) NAA, IBA, Zeatin, GA<sub>3</sub>
- (2) NAA, ABA, Zeatin, GA<sub>3</sub>
- (3) IBA, IAA, ABA, 2,4-D
- (4) IBA, BAP, ABA, Zeatin

Ans (1)

84.



Select the correct option w.r.t. Age pyramids.

- (1) a - Expanding, b - stable, c - Declining
- (2) a - stable, b - Expanding, c - Declining
- (3) a - stable, b - Declining, c - Expanding
- (4) a - Declining, b - stable, c - Expanding

Ans (1)

85. Match the following

(a)	Protein	(i)	SER
(b)	Lipid	(ii)	Golgi body
(c)	Glycoprotein	(iii)	Lysosome
(d)	Hydrolytic enzyme	(iv)	RER

- (1) a - i, b - ii, c - iii, d - iv
- (2) a - iv, b - ii, c - i, d - iii
- (3) a - iv, b - i, c - ii, d - iii
- (4) a - i, b - iii, c - ii, d - iv

Ans (3)

86. Select the correct option regarding genetic code of Glycine  
 (1) GUU, GUC, GUA (2) GAU, GAC, GAA  
 (3) GGU, GGA, GGC (4) GGU, GGA, GCU  
**Ans (3)**
87. Virus free plants can be generated through -  
 (1) Meristem culture (2) Somatic hybridisation  
 (3) Callus culture (4) Micropropagation  
**Ans (1)**
88. ATP formation occurs through which of the following -  
 (1) Photophosphorylation (2) Oxidative phosphorylation  
 (3) Substrate level phosphorylation (4) All of these  
**Ans (4)**
89. What are the requirements in Tissue culture  
 (1) Hormones like auxin, cytokinin, agar-agar (2) Inorganic salt, vitamin, amino acid only  
 (3) Carbon source like sucrose only (4) All of these  
**Ans (4)**
90. Which is wrong about mitochondria  
 (1) Site of aerobic respiration  
 (2) Supported by double unit membrane  
 (3) Infolding of inner membrane forms cristae  
 (4) Many circular DNA and few ribosomes are found in matrix.  
**Ans (4)**
91. m-RNA is formed by  
 (1) Translation (2) Transcription (3) Duplication (4) capping  
**Ans (2)**
92. Match list A and List B and choose correct option
- |     | List-A                    |       | List-B   |
|-----|---------------------------|-------|----------|
| (a) | Citrus canker             | (i)   | Fungi    |
| (b) | Spongiform encephalopathy | (ii)  | Prion    |
| (c) | Herpes                    | (iii) | Virus    |
| (d) | Red rot                   | (iv)  | Bacteria |
- (1) a - i, b - ii, c - iii, d - iv (2) a - ii, b - iii, c - iv, d - i  
 (3) a - iv, b - ii, c - iii, d - i (4) a - i, b - iii, c - ii, d - iv  
**Ans (3)**



93. The process of removal of anther from the flower bud before it dehisces is called as

- (1) Emasculation (2) Bagging  
(3) Embryo rescue (4) Budding

Ans (1)

94. Which of the following is a sex linked character

- (1) White color blindness (2) Red blue colorblindness  
(3) Night Blindness (4) Sickle cell anaemia

Ans (2)

95. Select the correct match

(I)	(II)	(III)
(a) +	(i) -	(P) Amensalism
(b) -	(ii) -	(Q) Commensalism
(c) -	(iii) 0	(R) Predation
(d) +	(iv) 0	(S) Competition

- (1) a - iv - Q, b - iii - P, c - ii - S, d - i - R (2) a - i - Q, b - ii - P, c - iii - S, d - iv - R  
(3) a - i - Q, b - iii - P, c - ii - S, d - iv - R (4) a - iv - Q, b - ii - P, c - iii - S, d - i - R

Ans. (1)

96. Black rot of mustard is caused by

- (1) *Colletrichum falcatum* (2) *Xanthomonas oryzae*  
(3) *Xanthomonas campestris* (4) *Phytophthora infestans*

Ans. (3)

97. Match the following :

**Column-I**

- (a) Ranthambore National Park  
(b) Kaziranga National Park  
(c) Jim corbett National Park  
(d) Nandan kanan zoological Park

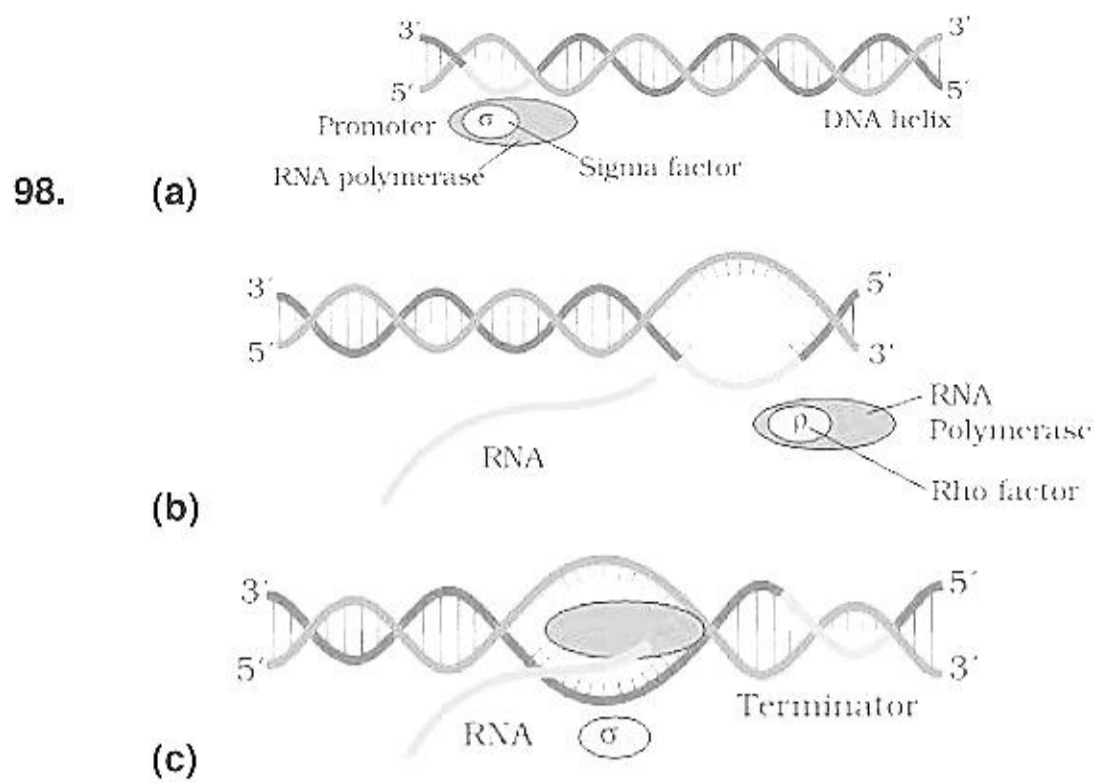
- (1) a-i, b-ii, c-iii, d-iv  
(3) a-ii, b-i, c-iv, d-iii

**Column-II**

- (i) Assam  
(ii) Rajasthan  
(iii) Orissa  
(iv) Uttarakhand

- (2) a-ii, b-iii, c-iv, d-i  
(4) a-iii, b-ii, c-i, d-iv

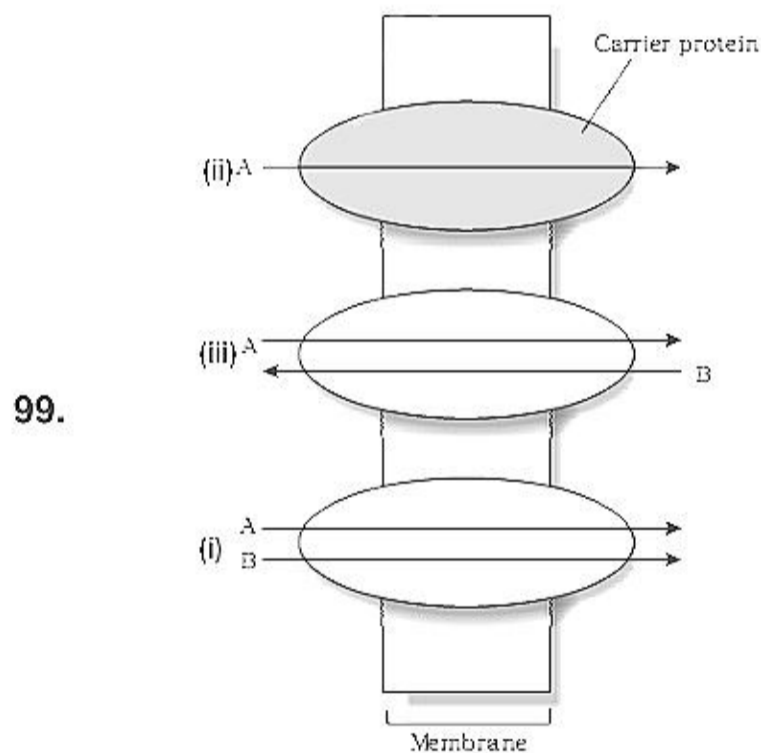
Ans. (3)



Identify a, b and c

- (1) (a) Elongation, (b) Termination, (c) Initiation    (2) (a) Initiation, (b) Termination, (c) Elongation  
 (3) (a) Initiation, (b) Elongation, (c) Termination    (4) (a) Termination, (b) Elongation, (c) Initiation

Ans (2)



Identify i, ii and iii

- (1) i- uniport, ii- Antiport, iii- symport    (2) i- uniport, ii-symport, iii- Antiport  
 (3) i- Antiport, ii-symport, iii- uniport    (4) i- symport, ii- uniport, iii- Antiport

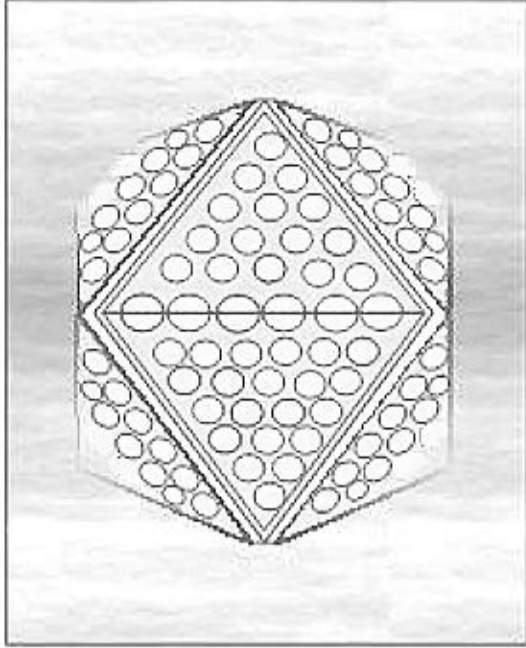
Ans (4)

100. How many pyruvate produced by oxidation of 1 glucose molecule ?

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

Ans (1)

101. Diagram of Adenovirus



Choose the correct for the given diagram

- (1) Bacteriophage - Tobacco mosaic disease      (2) Adenovirus - Cause of respiratory disease  
(3) Viroid - Potato spindle tumor disease      (4) Prion - Alzheimer's disease

**Ans** (2)

102. **Assertion** : Down syndrome, Klinefelter syndrome and Turner syndrome are chromosomal disorders.

**Reason** : In Klinefelter syndrome females are sterile.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

**Ans** (3)

103. **Assertion** : Respiratory pathway is considered as an amphibolic pathway

**Reason** : It involves both anabolism and catabolism.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

**Ans** (1)

104. **Assertion** : Biofortified crop is a source of higher protein, minerals and healthier fats.

**Reason** : Azolla is biofertilizer.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

**Ans** (2)



105. **Assertion** : Gibberellin is useful in early seed production in conifers.

**Reason** : Ethephon is responsible for early ripening in tomato and apple

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans** (2)

106. **Assertion** : Heterospory and retention of female gametophyte are responsible for origin of seed habit in *Selaginella*

**Reason** : *Psilotum* is a living fossil

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans** (2)

107. **Assertion** : Archaeobacteria are more similar to eukaryotes rather than eubacteria.

**Reason** : Archaeal genome is more similar to eukaryotic genome rather than bacterial genome

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

**Ans.** (1)

108. Amylopectin is

- (1) Soluble in H<sub>2</sub>O and have  $\alpha$ -1-4 and  $\alpha$  - 1,6 glycosidic bond
- (2) Insoluble in H<sub>2</sub>O and have  $\alpha$ -1-4 and  $\alpha$  - 1,6 glycosidic bond
- (3) Soluble in H<sub>2</sub>O and have  $\alpha$  - 1,6 glycosidic bond
- (4) Soluble in H<sub>2</sub>O and have  $\alpha$ -1-4 glycosidic bond

**Ans** (2)

109. In cockroach

- (1) Ejaculatory duct opens in phallic gland
- (2) Phallic gland stores sperms
- (3) Vas deferens opens in phallic gland
- (4) Phallic gland opens in left phallomere

**Ans** (4)

110. Plasmid of which bacterium was first time used in recombinant DNA technology?

- (1) *E.coli*
- (2) *Salmonella typhimurium*
- (3) *Haemophilus influenzae*
- (4) *Streptococcus pneumoniae*

**Ans** (2)

111. Which fat soluble vitamin is necessary for blood clotting

- (1) A                                      (2) D                                      (3) E                                      (4) K

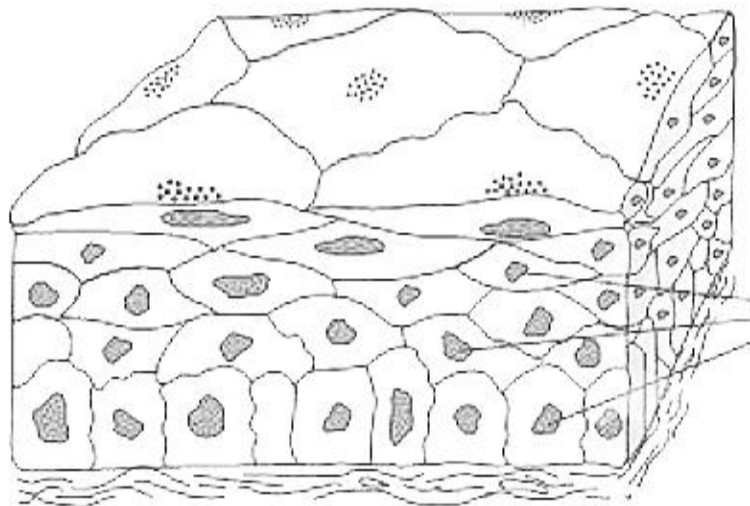
**Ans** (4)

112. Choose the correct option

- (1) Amphibia – Frog, Salamander, Bufo, Ichthyophis  
(2) Reptiles – Lizard, Turtle, Hyla, Ichthyophis  
(3) Birds – Pigeon, Parrot, Balaenoptera, Flying fox  
(4) Arthropods – Apis, Ancylostoma, Laccifer, Nereis

**Ans** (1)

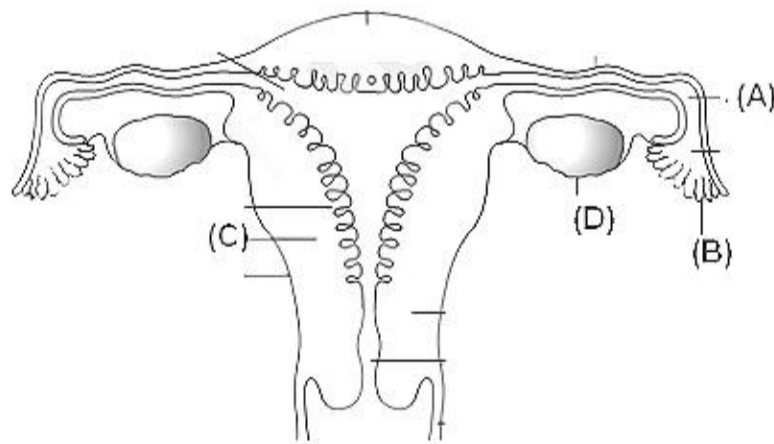
113. Identify the diagram and related function



- (1) Simple cuboidal epithelium – Diffusion  
(2) Simple Squamous epithelium – Secretion and absorption  
(3) Compound epithelium – Protection  
(4) Compound epithelium – Diffusion

**Ans** (3)

114. Choose the correct



- (1) (A) Ampulla – Site of blastocyst implantation  
(2) (B) Fimbriae – Collect ova  
(3) (C) Myometrium – Shed during menstrual bleeding  
(4) (D) Ovary – Secrete HCG

**Ans** (2)



115. Acidic pH of muscles is due to -  
 (1) Lactic acid (2) CO<sub>2</sub> (3) Arginine (4) Ketones

Ans (1)

116. Glucose on reacting with benedict solution may give the following precipitates except  
 (1) Violet precipitate (2) Orange red precipitate  
 (3) Brick red precipitate (4) Green/yellow precipitate

Ans (1)

117. Acquired Immunity mediated by which of the following  
 (1) Antibody formation by T-lymphocytes (2) Antibody formation by B- lymphocytes  
 (3) HCl by stomach (4) Bite by snake

Ans (2)

118. Blood circulation in earthworm is :  
 (1) Closed type (2) Open type  
 (3) Haemoglobin is present in RBC (4) Oxygen not transported by blood

Ans (1)

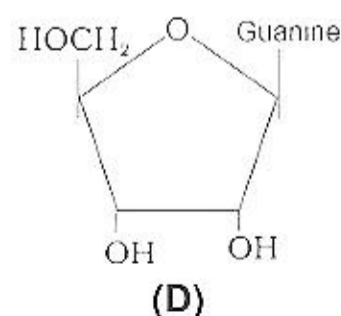
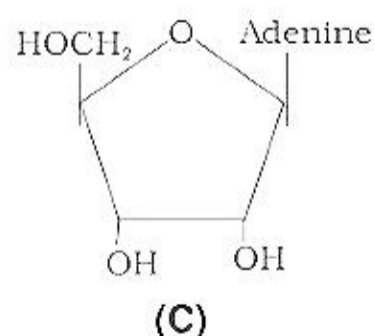
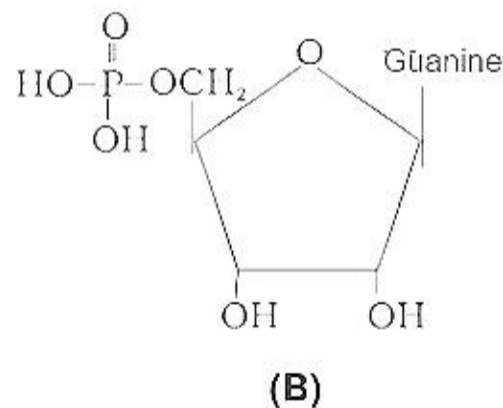
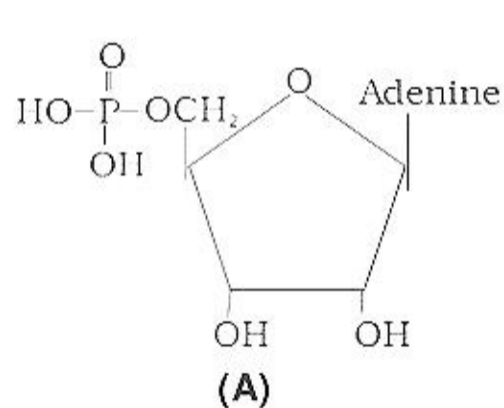
119. Given below are the life span of the organisms. Find the correct option :  
 (1) Fruitfly – 1 week  
 (2) Dog – 20-30 year  
 (3) Butterfly – 1-2 months  
 (4) Cat – 1 year

Ans (2)

120. Find the correct palindromic sequence :  
 5'ATTGCAAT3'  
 (1) 5'AACGTTA3' (2) 3'TAACGTTA5' (3) 5'TAACGTTA3' (4) 3'ATTGCAAT3'

Ans (2)

121. Which two are nucleotides :



(1) A & B (2) C & D (3) A & D (4) B & C

Ans (1)



122. Cocaine is obtained from :

- (1) *Papaver somniferum* (2) *Erythroxylum coca*  
(3) *Atropa belladonna* (4) *Datura*

Ans (2)

123. Myosin head separates from actin when :

- (1) ATP hydrolysis (2) When ATP attached to myosin head  
(3) When ATP releases from myosin head (4) When ATP releases from Actin

Ans (2)

124. Position of testis in *Periplaneta americana*

- (1) 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> abdominal segments (2) 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup> abdominal segments  
(3) 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup> abdominal segments (4) 5<sup>th</sup>, 6<sup>th</sup> abdominal segments

Ans. (2)

125. Activity of phagocytosis occurs through

- (1) Neutrophils and monocytes (2) Basophils and monocytes  
(3) Eosinophils and monocytes (4) Lymphocytes and neutrophils

Ans. (1)

126. **Assertion :** Gastrin is a hormone that is released from the gastrointestinal tract and helps in digestion

**Reason :** It promotes secretion of HCl and trypsinogen

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

Ans (3)

127. **Assertion :** Type-I diabetes is caused by destruction of B cells of islets of Langerhans.

**Reason :** Insulin can be taken as pills.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

Ans (3)

128. **Assertion :** Pituitary gland releases a hormone which is helpful in child birth.

**Reason :** Pituitary gland releases vasopressin and anti diuretic hormone which helps in child birth.

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.  
(2) If both assertion and reason are true but reason is not the correct explanation of assertion.  
(3) If assertion is true but reason is false.  
(4) If both assertion and reason are false.

Ans (3)

**PART - D (GENERAL KNOWLEDGE) & (APTITUDE & LOGICAL THINKING)**

**Total Number of Questions (18)**

127. For how many seats does the parliament hold Elections?

Ans. 543

128. Who is the present Chief Election Commissioner?

Ans. Sunil Arora

129. Which country has not yet conducted Anti Satellite missile test?

- (1) India (2) US (3) Russia (4) France

Ans. (4) France

130. Arrange the cities from East to West

- (1) Cairo (2) Tehran (3) Tripoli (4) Baghdad

Ans. 2, 4, 1, 3 (Tehran, Baghdad, Cairo, Tripoli)

131. Facebook : Alphabet :: Twitter : ?

- (1) Bird (2) Elephant (3) Tiger (4) Animal

Ans. (1) Bird

132. What will be the next number in the series?

10, 9, 7, 4, ?

Ans. 0

133. Ram is the brother of Seema & Ram is married to Radhika. Seema has two Sons Raushan & Manu. What is Raushan to Radhika.

- (1) Niece (2) Nephew (3) Cousin (4) None of These

Ans. (2) Nephew

134. Which of the following states is odd one out in terms of International border?

- (1) Rajasthan (2) Gujarat (3) Punjab (4) Himachal Pradesh

Ans. (4) Himachal Pradesh

135. A, B, C, D, E, F & G are sitting in a row facing northwards. F is sitting immediate right of E. G is 4<sup>th</sup> left of E. B & D are next to C. Third left to D is a corner. Who is in the middle of row?

Ans. D

136. Neerav Modi is associated with

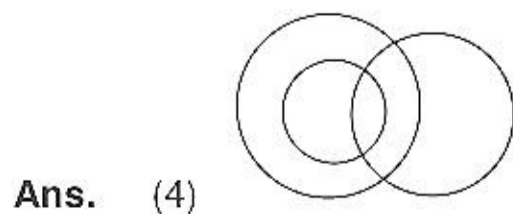
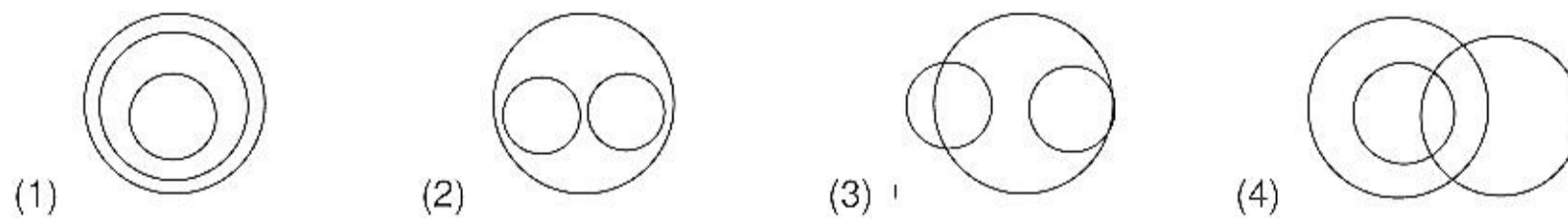
- (1) Share Market (2) Oil (3) Diamond (4) Gold

Ans. (3) Diamond

137. A Barrel is completely filled with acetone. 20% of the acetone is replaced by Water. This is done 2 more times. What is the final % of acetone remaining in the barrel?

Ans. 51.2%

138. Which of the following Van diagram represents relations between Female : Sister :: Parents





139. In a class, 70% students knew python language, 60% knew C++ & 10% knew NO language, then how many students knew both languages?

Ans. 40%

140. A Seller sells his product on 14% profit of the market price. If the selling price is 3420 then find the market price.

Ans. 3000

141. In a class of 140 students, those who opted Science, Social Science & languages were represented by 4:2:1 ratio. If a batch of 20 new students come & opt Science then what will be the new ratio?

Ans. 5:2:1

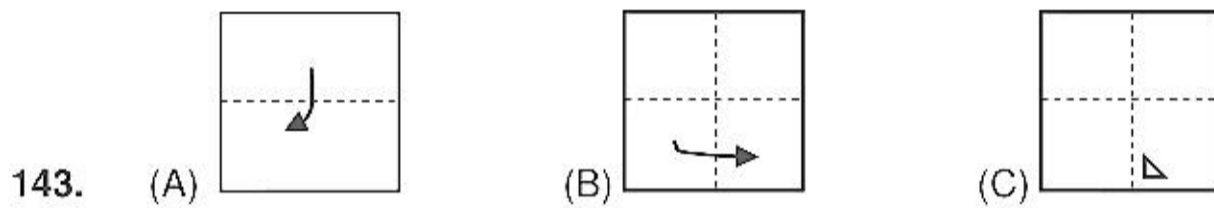
142. The 4 letters in a box have certain relationship then what will replace question mark

D	E
G	J

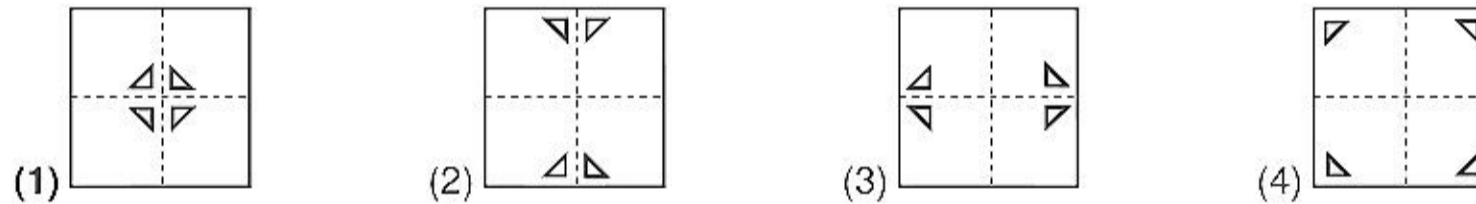
K	L
N	Q

G	H
?	M

Ans. J

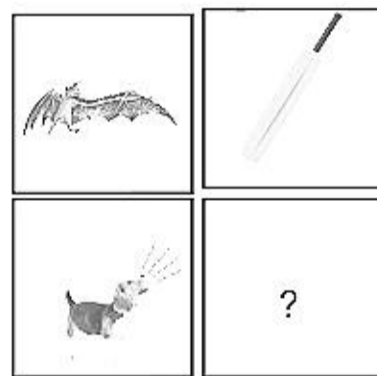


The following paper is folded and cut as shown. Find the pattern on unfolded paper



Ans. (2)

144.



Ans. (1)