ANSWER KEY

AITS FINAL TRACK

PART TEST-06

PHYSICS

SECTION-A

Q.1 (3)	**Q.2** (4)	**Q.3** (2)	**Q.4** (4)	**Q.5** (3)	**Q.6** (1)	**Q.7** (2)	**Q.8** (4)	**Q.9** (2)	**Q.10** (3)
Q.11 (1)	**Q.12** (4)	**Q.13** (1)	**Q.14** (2)	**Q.15** (2)	**Q.16** (3)	**Q.17** (4)	**Q.18** (2)	**Q.19** (2)	**Q.20** (3)
Q.21 (4)	**Q.22** (3)	**Q.23** (4)	**Q.24** (3)	**Q.25** (1)	**Q.26** (3)	**Q.27** (1)	**Q.28** (3)	**Q.29** (2)	**Q.30** (2)
Q.31 (2)	**Q.32** (4)	**Q.33** (2)	**Q.34** (4)	**Q.35** (1)					

SECTION-B

Q.36 (3)	**Q.37** (3)	**Q.38** (1)	**Q.39** (1)	**Q.40** (2)	**Q.41** (2)	**Q.42** (1)	**Q.43** (4)	**Q.44** (3)	**Q.45** (2)
Q.46 (2)	**Q.47** (1)	**Q.48** (2)	**Q.49** (3)	**Q.50** (2)					

CHEMISTRY

SECTION-A

Q.51 (1)	**Q.52** (2)	**Q.53** (2)	**Q.54** (1)	**Q.55** (1)	**Q.56** (3)	**Q.57** (2)	**Q.58** (4)	**Q.59** (1)	**Q.60** (3)
Q.61 (4)	**Q.62** (4)	**Q.63** (3)	**Q.64** (4)	**Q.65** (2)	**Q.66** (3)	**Q.67** (1)	**Q.68** (3)	**Q.69** (1)	**Q.70** (2)
Q.71 (1)	**Q.72** (2)	**Q.73** (2)	**Q.74** (1)	**Q.75** (3)	**Q.76** (2)	**Q.77** (3)	**Q.78** (4)	**Q.79** (4)	**Q.80** (2)
Q.81 (3)	**Q.82** (1)	**Q.83** (1)	**Q.84** (3)	**Q.85** (3)					

SECTION-B

Q.86 (2)	**Q.87** (2)	**Q.88** (4)	**Q.89** (4)	**Q.90** (2)	**Q.91** (3)	**Q.92** (4)	**Q.93** (2)	**Q.94** (1)	**Q.95** (2)
Q.96 (1)	**Q.97 (1)**	**Q.98** (2)	**Q.99** (2)	**Q.100** (3)					

BIOLOGY-I

SECTION-A

Q.101 (1)	**Q.102** (4)	**Q.103** (1)	**Q.104** (1)	**Q.105** (3)	**Q.106** (4)	**Q.107** (3)	**Q.108** (2)	**Q.109** (1)	**Q.110** (3)
Q.111 (2)	**Q.112 (1)**	**Q.113** (2)	**Q.114** (1)	**Q.115** (2)	**Q.116** (2)	**Q.117** (4)	**Q.118** (1)	**Q.119** (3)	**Q.120** (3)
Q.121 (2)	**Q.122** (3)	**Q.123** (3)	**Q.124** (1)	**Q.125** (4)	**Q.126** (3)	**Q.127** (4)	**Q.128** (2)	**Q.129** (4)	**Q.130** (2)
Q.131 (3)	**Q.132** (3)	**Q.133** (3)	**Q.134** (1)	**Q.135** (3)					

SECTION-B

Q.136 (3)	**Q.137** (4)	**Q.138** (2)	**Q.139** (2)	**Q.140** (2)	**Q.141** (4)	**Q.142** (4)	**Q.143** (4)	**Q.144** (3)	**Q.145** (4)
Q.146 (4)	**Q.147** (3)	**Q.148** (3)	**Q.149** (2)	**Q.150** (2)					

BIOLOGY-II

SECTION-A

Q.151 (4)	**Q.152** (4)	**Q.153** (4)	**Q.154** (1)	**Q.155** (3)	**Q.156** (1)	**Q.157** (4)	**Q.158** (2)	**Q.159** (3)	**Q.160** (4)
Q.161 (2)	**Q.162** (3)	**Q.163** (3)	**Q.164** (1)	**Q.165** (2)	**Q.166** (4)	**Q.167 (3)**	**Q.168** (3)	**Q.169** (3)	**Q.170** (4)
Q.171 (2)	**Q.172** (1)	**Q.173** (2)	**Q.174** (3)	**Q.175** (1)	**Q.176** (4)	**Q.177** (1)	**Q.178** (3)	**Q.179** (4)	**Q.180** (3)
Q.181 (4)	**Q.182** (4)	**Q.183** (2)	**Q.184** (4)	**Q.185** (1)					

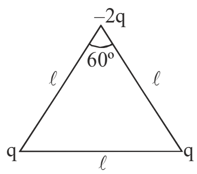
SECTION-B

Q.186 (2)	**Q.187** (2)	**Q.188** (2)	**Q.189** (2)	**Q.190** (3)	**Q.191** (2)	**Q.192** (1)	**Q.193** (1)	**Q.194** (3)	**Q.195** (2)
Q.196 (4)	**Q.197** (3)	**Q.198** (2)	**Q.199** (1)	**Q.200** (1)					

PHYSICS
SECTION-A

Q.1 (3)

According to question



It is a combination of tow dipoles at 60°

So

$P_{net} = \sqrt{3}p$

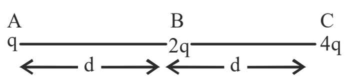
where $p = q\ell$

So $P_{net} = \sqrt{3}q\ell$

Q.2 (4)

During charging by conduction, both the objects acquire same type of charge. Finally both rod & sphere becomes negatively charged & in order for the neutral sphere to become negative, it must gains electron.

Q.3 (2)



$$F_A = \frac{k(q)(2q)}{d^2} + \frac{k(4q)(q)}{(2d)^2}; F_A = \frac{3kq^2}{d^2}$$

$$F_C = \frac{k(4q)(q)}{(2d)^2} + \frac{k(4q)(q)}{d^2}$$

$$F_C = \frac{9kq^2}{d^2}, \qquad \frac{F_A}{F_C} = \frac{T_{AB}}{T_{BC}} = \frac{1}{3} \Rightarrow 1:3$$

Q.4 (4)

• When there is no net charge resides inside any closed surface then only net electric flux linked with the surface is zero.

• Electric field due to an electric dipole is non uniform

Q.5 (3)

$$\phi_{BCGF} = \phi_{\text{due to q}} + \phi_{\text{due to 3q}} + \phi_{\text{due to 2q}}$$

$$\phi_{\text{due to q}} = \frac{q}{24\varepsilon_0}$$

$$\phi_{\text{due to 3q}} = \frac{3q}{24\varepsilon_0}$$

$$\phi_{\text{due to 2q}} = 0$$

$$\phi_{BCGF} = \frac{q}{24\varepsilon_0} + \frac{3q}{24\varepsilon_0} + 0 = \frac{4q}{24\varepsilon_0} = \frac{q}{6\varepsilon_0}$$

Q.6 (1)

$$\because E = \frac{KQz}{(R^2+z^2)^{3/2}}$$

$$\therefore \frac{E_1}{E_2} = \frac{R}{(R^2+R^2)^{3/2}} \times \frac{(R^2+4R^2)^{3/2}}{2R} = \frac{5\sqrt{5}}{4\sqrt{2}}$$

Q.7 (2)

$$F = \frac{1}{4\pi\in_0}\frac{q_1q_2}{r^2}$$

$$\in_0 = \frac{q_1q_2}{4\pi Fr^2}$$

Unit of $\in_0$ is $C^2/N\text{-}m^2$

Q.8 (4)

When the Gaussian surface encloses no charge, then the electric flux through that surface is zero.

Electric field over the Gaussian surface need not be zero at every point on that surface.

Q.9 (2)

For balance $mg = eE \Rightarrow E = \frac{mg}{e}$

Also $m = \frac{4}{3}\pi r^3 d = \frac{4}{3} \times \frac{22}{7} \times (10^{-7})^3 \times 1000\text{kg}$

$$\Rightarrow E = \frac{\frac{4}{3} \times \frac{22}{7} \times (10^{-7})^3 \times 1000 \times 10}{1.6 \times 10^{-19}}$$

$= 260$ N/C

($g = 10$ newton/kg, $e = 1.6 \times 10^{-19}$ coulomb)

Q.10 (3)

$$E = \frac{Q}{A\varepsilon_0\varepsilon_r} \Rightarrow E \propto \frac{1}{\varepsilon_r}$$

Q.11 (1)

Field lines of q1 passes through surface of hemisphere one time.

Field lines of q_2 passes through surface of hemisphere two time so net flux due to q_2 is zero.

Net flux due to q1 is non zero.

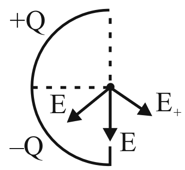
Q.12 (4)

$$\vec{E_P} = \vec{E_A} + \vec{E_B}$$

$= +\frac{\sigma}{2\in_0} - \frac{\sigma}{2\in_0}$ (both are in opposite direction)

$= 0$

Q.13 (1)



Q.14 (2)

$$E_{axis} = \frac{2kP}{r^3}$$

$$E_{eq.} = \frac{kP}{r^3}$$

Q.15 (2)
Maximum torque = pE
$= 2 \times 10^{-6} \times 3 \times 10^{-2} \times 2 \times 10^{5} = 12 \times 10^{-3}$ N-m

Q.16 (3)

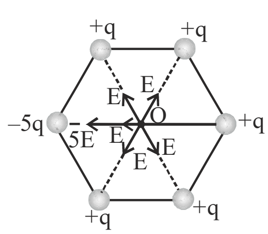
$$E = \frac{1}{4\pi \in_0} \frac{Q}{r^2}$$

$Q = 4\pi\in_0 Er^2$
Now, Surface change density -

$$\sigma = \frac{Q}{4\pi R^2}$$

$$\sigma = \frac{4\pi \in_0 Er^2}{4\pi R^2} \qquad \boxed{\sigma = \in_0 E\left(\frac{r}{R}\right)^2}$$

Q.17 (4)
To obtained net field 6E at centre O, the charge to be placed at remaining sixth corner is –5q. (see following figure)



Q.18 (2)
$\vec{E}$ is maximum at sharp corners while entire conductor is equipotential

Q.19 (2)

Torque $\vec{\tau} = \vec{p} \times \vec{E} = pE\sin\theta$

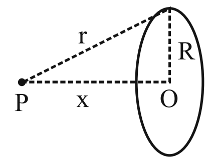
or $4 = p \times 2 \times 10^5 \sin 30°$

or $p = \dfrac{4}{2 \times 10^5 \times \sin 30°} = 4 \times 10^{-5}$ c – m

Dipole moment, $p = q\ell$

$$\therefore\ q = \frac{p}{\ell} = \frac{4 \times 10^{-5}}{0.02} = 2 \times 10^{-3}\,C = 2mC.$$

Q.20 (3)



$$E = \frac{kQx}{(R^2 + x^2)^{3/2}}$$

$r^2 = R^2 + x^2$
$x^2 = r^2 - R^2$

Q.21 (4)
Potential energy

$$U = -\vec{p}.\vec{E} = -\left(2\hat{i} - 3\hat{j} + 4\hat{k}\right).\left(5\hat{i} + 2\hat{j} - 3\hat{k}\right)$$

$= -(10 - 6 - 12) = 8$ joule

Q.22 (3)

$$V_A - V_B = \left(\frac{kQ}{a} + \frac{k(-Q)}{a+d}\right) - \left(\frac{k(-Q)}{a} + \frac{kQ}{a+d}\right)$$

$$= \frac{2kQd}{a(a+d)}$$

Q.23 (4)

$$V = -\frac{dV}{dx} = -(4x)\hat{i}$$

$$V = -4(2) = -8\hat{i}$$

Q.24 (3)
$V' = n^{2/3}\, V = 8^{2/3} \times 2$ volt
$= 4 \times 2$ volt $= 8$ volt

Q.25 (1)

$$\frac{(K_f)_Q}{(K_f)_{2Q}} = \frac{4m}{m} = \frac{4}{1}$$

$$\Rightarrow (K_f)_Q = \frac{4}{5}\left[\frac{k(2Q)(Q)}{r}\right] = \frac{8kQ^2}{5r}$$

Q.26 (3)
$W_{ext} = q[V_f - V_i]$
$= (2\mu C)\{(-5V) - (+10V)\}$
$= -30\ \mu J$

Q.27 (1)

$$U_{system} = \frac{kQq}{\ell} + \frac{kq^2}{\ell} + \frac{kQq}{\ell} = 0$$

$$\Rightarrow 2Qq = -q^2 \Rightarrow Q = -\frac{q}{2}$$

Q.28 (3)

$\Delta V_{max} = Er = 10 \times 3 = 30$ volt

$\Delta V = Er \cos\theta = 25$ volt

Q.29 (2)

Electrostatic field is always perpendicular to the surface of conductor.

Q.30 (2)

$$V_B - \frac{q}{2} - 12 - \frac{q}{4} + 24 = V_A$$

$$\frac{3q}{4} = 12$$

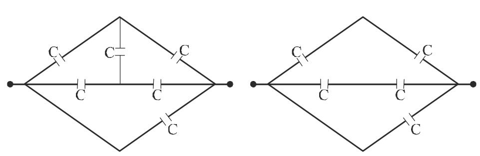
$q = 16\ \mu C$

$$V_B - \frac{16}{2} = V_A$$

$V_B - V_A = 8$ V

Q.31 (2)

Equivalent circuit diagram

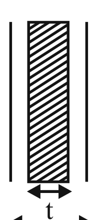


Q.32 (4)

$$f = Q \in = Q\left(\frac{Q}{2A \in}\right) = \frac{Q^2}{2A \in}$$

Q.33 (2)

When a dielectric of thickness t is inserted b/w the plates



$$C = \frac{A \in_0}{d - t + \frac{t}{k}}$$

For metal $k = \infty$

$$\therefore C = \frac{A \in_0}{d - t}$$

For given question $t = \frac{d}{2}$

$$\therefore C = 2\left(\frac{A \in_0}{d}\right) \text{ (Be comes double)}$$

Q.34 **(4)**

$(V_B - V_A) \times 2\mu + (V_B - V_A) \times 3\mu = 0$

$(V_B - 1000) \times 2 + (V_B - 0) \times 3 = 0$

$2V_B - 2000 + 3V_B = 0$

$5V_B = 2000$

$V_B = 400$ volt

Q.35 (1)

As the dielectric slab is pulled out, the equivalent capacity of the system decreases and hence charge supplied by battery decreases as potential of system remains constant. It means charging of battery takes place and a positive charge flows from a to b.

SECTION-B

Q.36 (3)

$$E = \frac{2k\lambda}{a}\sin\left(\frac{\alpha}{2}\right); \lambda = \frac{Q}{\left(\frac{\pi a}{2}\right)}; \alpha = 90^o$$

$$E = \frac{4k}{a}\frac{Q}{\pi a} \times \sin(45^o) = \frac{2\sqrt{2}kQ}{\pi a^2}$$

Q.37 (3)

$$E_1 = \frac{KQ}{R^2}; E_2 = \frac{K(2Q)}{R^2};$$

$$E_3 = \frac{K(4Q)}{(2R)^3} \times R = \frac{KQ}{2R^2}$$

$E_2 > E_1 > E_3$

Q.38 (1)

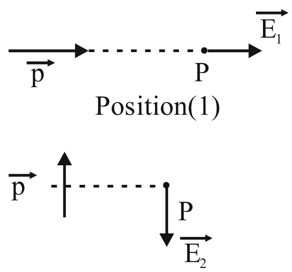
$$F = \frac{kQ^2}{R^2} \qquad .....(1)$$

$$F_2 = \frac{k}{R^2}\left(Q - \frac{3}{4}Q\right)\left(Q + \frac{3}{4}Q\right) = \frac{7}{16}\frac{kQ^2}{R^2} \quad ....(2)$$

By (1) & (2)

$F_2 = \frac{7}{16}F$

Q.39 (1)



Q.40 (2)

$W = \Delta K$

$qE\frac{I}{2} = \frac{1}{2}mv^2$

$v = \sqrt{\frac{qEI}{m}}$

$T - qE = \frac{mv^2}{I}$

$T = 2qE$

Q.41 (2)

$$V_A - V_B = -\vec{E}.\int_B^A d\vec{r} = -\vec{E}.[\vec{r}_A - \vec{r}_B]$$

$$= \vec{E}.(\vec{r_B} - \vec{rA}) = 50\sqrt{2}\left[\frac{\hat{i}+\hat{j}}{\sqrt{2}}\right].(-4\hat{i} - 2\hat{j})$$

$= -300$ volt

Q.42 (1)

Factual.

Q.43 (4)

Here, $V_A = V_B = B_C$

$\therefore W_1 = W_2 = 0$

Q.44 (3)

Sol. $U_i = -\frac{kq^2}{a} - \frac{kq^2}{a} + \frac{kq^2}{2a} = -\frac{3}{2}\frac{kq^2}{a}$

$U_f = +\frac{kq^2}{a} - \frac{kq^2}{a} - \frac{kq^2}{2a} = -\frac{1}{2}\frac{kq^2}{a}$

$\Delta U = U_f - U_i = \frac{kq^2}{a} = \frac{q^2}{4\pi \in_0 a} = W.D$

Q.45 (2)

$U = -PE\cos\theta$

Q.46 (2)

let V in potential difference of battery

$C_{123} = 1\mu F, q_{123} = V\mu C$

$q_2 = V\mu C, q_4 = CV = 4\mu C$

$\frac{q_2}{q_4} = \frac{1}{4}$

Q.47 (1)

Energy required $= CV^2 = A\varepsilon_0 E^2 d$

$= \frac{A \in_0}{d}(\in d)^2 = A \in_0 \in^2 d$

$= 25 \times 10^{-4} \times 8.85 \times 10^{-12}(600^2 \times 2.0 \times 10^{-3})$

$= 1.59 \times 10^{-11} = 15.9 \times 10^{-12}$ J

Q.48 (2)

The Wheatstone bridge is in the balanced condition.

$C_{eff} = 6\mu F$

Total energy stored, $U = \frac{1}{2}C_{eff}V^2$

$= \frac{1}{2} \times [6\mu] \times 2^2 = 12\,\mu J$

Q.49 (3)

$C_1 = \frac{\varepsilon_0 A}{d}$ and $C_2 = \frac{K\varepsilon_0 A}{2d}$

$\Rightarrow \frac{C_2}{C_1} = \frac{K}{2} \Rightarrow \frac{40 \times 10^{-12}}{10 \times 10^{-12}} = \frac{K}{2} \Rightarrow K = 8$

Q.50 (2)

Energy required $= CV^2 = \frac{A\in}{d}(Ed)^2 = A \in E^2 d$

$$= A \in \left(\frac{\sigma}{\in}\right)^2 d$$

$$= \frac{A\sigma^2 d}{\in}$$

CHEMISTRY

SECTION-A

Q.51 (1)

Maximum boiling azeotrope show large negative deviation from Rault's law.

Q.52 (2)

Both statement I and statement II are correct.

Q.53 (2)

$Mg(NO_3)_2 \rightarrow Mg^{2+} + 2NO_3^-$

So [n = 3]

Degree of dissociation $\propto = \frac{i-1}{n-1}$

$\because i = 2.74$

So $\propto = \frac{2.74-1}{3-1} = \frac{1.74}{2} = 0.87$

$= 0.87 \times 100 = 87\%$

Q.54 (1)

The inter particle forces in between chloroform and acetone increases due to H-bonding and thus $\Delta_{mix} V$ becomes negative so the resulting solution with have volume less than 70 mL.

Q.55 (1)

Because its non valatile nature and high concentration and does not dissociate in water that will not form ions in the solution.

Q.56 (3)

$$\frac{P° - P_s}{P_s} = \frac{WM}{m \times w}$$

Given m = 40

w = 114 g

$M_{octane} = 114$

$$\therefore \frac{100-80}{80} = \frac{w \times 114}{40 \times 114}$$

[w = 10 g]

Q.57 (2)

$$\text{Concentration in ppm} = \frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$$

$$= \frac{1.04g}{10^5 g} \times 10^6 = 10.4 \text{ ppm}$$

Q.58 (4)

The entropy change of mixture of A and B is zero

Because the entropy of mixing for an ideal solution is positive as randomness or disorder increases.

Q.59 (1)

$$\frac{P° - P_s}{P°} = \frac{w \times M}{m \times w}$$

$$= \frac{0.850\text{bar} - 0.845\text{bar}}{0.850\text{bar}} = \frac{0.5g \times 78g | mol}{39g \times M_2}$$

$M_2 = 170 \text{ g mol}^{-1}$

Q.60 (3)

(1) Molality $\because$ M of KI = 39 + 127 = 166 g mol$^-$

$$m = \frac{w \times 1000}{M \times Wgm} = \frac{20 \times 1000}{166 \times 80} = 1.5 \text{ m}$$

$$V = \frac{\text{Mass}}{\text{Density}} = \frac{100}{1.25} = 80 \text{ ml}$$

$$(2)\ M = \frac{w \times 1000}{M \times V(ml)} = \frac{20 \times 1000}{166 \times 80ml} = 1.5 \text{ M}$$

Mole fraction of KI :-

$$X_B = \frac{n_B}{n_A + n_B} = \frac{\frac{20}{166}}{\frac{80}{18} + \frac{20}{166}} = \frac{0.12}{0.12 + 4.44} = 0.0263$$

Q.61 (4)

$P_T = P_A^\circ X_A + P_B^\circ X_B$

$X_A + X_B = 1$

$(X_B = 1 - X_A)$

$760 = 520 X_A + 1000(1 - X_A)$

$480 X_A = 240$

$X_A = \frac{1}{2}$ or 50%

Q.62 (4)

$i = 1 + (n-1) \times \propto$

$i = 1 + (4-1) \times \frac{90}{100}$

$i = 3.7$

$\Delta T_b = iK_b m = 3.7 \times 0.52 \times 0.2 = 0.3848$

$\therefore T_b = T_b^\circ + 0.3848$

$= 373 + 0.38 = 373.38$ K.

Q.63 (3)

Molarity and Normality increas with temperature

% w/v also increase with temp. As they are valume related.

Q.64 (4)

$T_b^\circ = (B.P.)_{H_2O} = 100°C$ $T_b = 100.25°C$ (for solution)

$\Delta T_b = T_b - T_b^\circ = 0.25$

$\Delta T_b = K_b \cdot m$

$$0.25 = K_b \cdot \frac{1}{60 \times w} \quad .....(1)$$

$$\Delta T_b = K_b \times \frac{3}{180 \times w} \quad ......(2)$$

$eq(1)/eq(2) = [\Delta T_b = 0.25]$

T_b of glucose = 100.25 °C

Q.65 (2)

$\Delta V_{mix} > O, \quad \Delta S_{mix} > O$

Q.66 (3)

Molarity of cane sugar $= \dfrac{5g}{342 \times 100mL} \times \dfrac{1000}{1L}$

$= 0.146\,m$ .....(1)

Molarity of substance X

$= \dfrac{1g}{M \times 100} \times \dfrac{1000}{1L} = \dfrac{10}{M}$ molarity .....(2)

But $(1) = (2)$

$\dfrac{10}{M} = 0.146 \qquad \therefore M = \dfrac{10}{0.146} = 68.4$

Q.67 (1)

Molarity $= \dfrac{M_1V_1 + M_2V_2}{V_1 + V_2} = \dfrac{750 \times 0.5 + 250 \times 2}{1000}$

$= 0.875\,M.$

Q.68 (3)

Raoult's law.

Q.69 (1)

$\Lambda_m = \dfrac{K \times 1000}{M} = \dfrac{9.2 \times 10^{-2}}{0.02} = 4.6$

Q.70 (2)

For $CaCl_2$

$\lambda_0 = \lambda^0_{Ca^{2+}} + 2\lambda^0_{Cl^-}$

$= 271.6\,s\,cm^2\,mol^-$

For $MgSO_4$

$\lambda_0 = \lambda^0_{Mg^{2+}} + 2\lambda^0_{SO_4^{2-}}$

$= 266\,s\,cm^2\,mol^-$

Q.71 (1)

$K = G^* \times G$ (Where $G^* \rightarrow$ Cell constant

if $[K = G]$ $G \rightarrow$ Conductance

$\left[\dfrac{K}{G} = 1\right]$ So cell constant = 1

Q.72 (2)

Reason :- Because electrons flow takes place from anode to cathode

Q.73 (2)

Reason :- Cu is anode So it show oxidation lose e^- and cathod is Ag which gain e^- and show reduction.

Q.74 (1)

$T\ell^{3+} + 2e^- \rightarrow T\ell^+ = nFE° = 2 \times 1.26 \times F = 2.52\,F$

$T\ell^+ + 1e^- \rightarrow T\ell = nFE° = 1 \times (-0.336) \times F = -0.336\,F$

$T\ell^{3+} + 3e^- \rightarrow T\ell \qquad E° = \dfrac{2.52F - 0.336F}{nF}$

$= \dfrac{2.184}{3} = 0.728\,V$

Q.75 (3)

$2NaCl + 2H_2O \xrightarrow{\text{Electricity}} 2NaOH + \underset{\text{At cathode}}{H_2} + \underset{\text{At anode}}{Cl_2}$

Q.76 (2)

The lower the electrode potential, the stronger is the reducing agent.

Q.77 (3)

$W_{Elec} = -nF\,E_{cell}$

and efficiency of cell

$= \dfrac{\Delta G}{\Delta H} \times 100 = \dfrac{-nF_{cell}}{\Delta H} \times 100 = \dfrac{E_{Eelc}}{\Delta H} \times 100$

$\therefore \Delta H \leq$ Work electrical.

Q.78 (4)

$\Lambda_m = \dfrac{K \times 1000}{M} = \dfrac{0.001 \times 1000}{0.1} = 10$

Q.79 (4)

All of the above.

Q.80 (2)

$E^\circ_{cell} = E^\circ_{Ce^{4+}/Ce^{3+}} - E^\circ_{Co^{2+}/Co}$

$1.89 = E^\circ_{Ce^{4+}/Ce^{3+}} - (-0.28)$

$E^\circ_{Ce^{4+}/Ce^{3+}} = 1.89 - 0.28 = +1.61\,V.$

Q.81 (3)

As dry cell can't be recharge when it exhaust.

Q.82 (1)

$Al^{3+} + 3e^- \rightarrow Al$

27 g Al deposite by = 3F

5.4 g Al will deposite by 0.6 F

Q.83 (1)

In mercury cell cathode used is paste of HgO and carbon.

Q.84 (3)

On dilution the volume of the solution increases thus equivalent as well as molar conductivity increases. However the number of current carrying particles per cm^3 decreases an diluting the solution.

Q.85 (3)

The number of faradays passed is always. equal to the number of equivalents mass of produced. Just it is equivalents and not moles. $\therefore$ 2.5 F will deposit 2.5 g equivalents.

SECTION-B

Q.86 (2)

HgI reacts with K.I and form $K_2[HgI_4]$

Due to this the no. of ions decreases thus decreasing the Vant Hoff factor

$[\Delta T_F = ik_F \times m]$

Since i has decreased, it result in less depression in the freezing point causing the freezing point to raise.

Q.87 (2)

W = 15 gm

M = 98 gm mol–

$$V = \frac{\text{Mass}}{\text{Density}} = \frac{100}{1.5}$$

$$M = \frac{W \times 1000}{M \times V}$$

$$M = \frac{15 \times 1000}{98 \times 100/0.5} = 2.29\ \text{M}.$$

Q.88 (4)

Both solution have equal concentration and equal ions so $Ca(NO_3)_2$ and Na_2SO_4 isotonic in nature at same concentration.

Q.89 (4)

$$\text{mole of } C_2H_5OH = \frac{828}{46} = 18$$

$$\text{mole of } H_2O = \frac{36}{18} = 2$$

$$\therefore X_{H_2O} = \frac{n}{n+N} = \frac{2}{2+18} = 0.1$$

Q.90 (2)

$$\text{Conc. of } O_2 \text{ in ppm} = \frac{\text{mass of } O_2}{\text{mass of } H_2O} = 10^6$$

$[1\text{kg } H_2O = 10^6 \text{mg } H_2O]$

$$\text{concentration in ppm} = \frac{6\text{ mg}}{10^6\text{ mg}} \times 10^6 = 6\text{ ppm}.$$

Q.91 (3)

$P_A = X_A \times P_A^0$ $\qquad$ $P_B = X_B \times P_B^0$

$\therefore\ P_A^0 = \frac{P_A}{X_A}$ $\qquad$ $P_B^0 = \frac{P_B}{X_B}$

A/c to the question $P_A^0 > P_B^0$ thus. $\frac{P_A}{X_A} > \frac{P_B}{X_B}$

Rearrang the relation to get

$$\frac{P_A}{P_B} > \frac{X_A}{X_B} \qquad ....(1)$$

By question YA is the mole fraction 6F A and YB is the mole fraction of B in vapour phase respectively

$$Y_A = \frac{P_A}{P_{Total}} \qquad Y_B = \frac{P_B}{P_{Total}}$$

$$\left[\frac{P_A}{P_B} = \frac{\frac{Y_A}{P_{Total}}}{\frac{Y_B}{P_{Total}}}\right] \qquad \therefore \frac{P_A}{P_B} = \frac{Y_A}{Y_B} \ ....(2)$$

Combining the eq. (1) and eq. (2)

we get $\left[\frac{X_A}{X_B} < \frac{Y_A}{Y_B}\right]$

Q.92 (4)

Because antifreeze lowers the freezing point of water.

Q.93 (2)

Ideal solution	$\Delta H_{mix} = 0$	$\Delta V_{mix} = 0$
non ideal	$\Delta H_{mix} \neq 0$	$\Delta V_{mix} \neq 0$
positive deviation	$\Delta H_{mix} > 0$	$\Delta V_{mix} > 0$
negative	$\Delta H_{mix} < 0$	$\Delta V_{mix} < 0$

Q.94 (1)

At anode $Cu \rightarrow Cu^{2+} + 2e^-$

At cathode $2Ag^+ + 2e^- \rightarrow 2Ag$ $\qquad$ where n = 2

Given

$E^\circ_{cell} = 0.46$

$$E_{cell} = E^\circ_{cell} - \frac{0.0591}{n} \log \frac{[Cu^{2+}]}{[Ag^+]^2}$$

$$Ecell = 0.46 - \frac{0.059}{2} \log\left[\frac{0.01}{0.1 \times 0.1}\right] = 0.46$$

Q.95 (2)

An electrolytic cell

Q.96 (1)

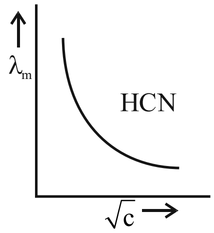
$$2NaCl + 2H_2O \rightarrow \underset{\substack{\text{Alkali}\\ \text{[increase basic}\\ \text{nature of Solution]}}}{2NaOH} + \underset{\substack{\text{At}\\ \text{Cathode}}}{H_2} + \underset{\substack{\text{At}\\ \text{Anode}}}{Cl_2}$$

But concentration of Na^+ ions not decreases.

Q.97 **(1)**

Q.98 (2)

For weak electrolytes



Q.99 (2)

$$\kappa = \frac{1}{77}$$

$$\Lambda_m = \frac{\kappa \times 1000}{C} = \frac{1000}{77 \times 0.1} = 130\ \text{Scm}^2\text{mol}^{-1}$$

Q.100 (3)

$96500C\ C \longrightarrow N_A$ number of electron

$$(2 \times 60 \times 2)C \rightarrow \frac{N_A \times 240}{96500} = 0.015 \times 10^{23}$$

$$= 0.15 \times 10^{22}$$

BIOLOGY-I
SECTION-A

Q.101 (1)
A typical anther is bilobed structure.

Q.102 (4)

Q.103 (1)
Egg apparatus is three celled structure.

Q.104 (1)
Spherical 25 - 50 μm

Q.105 (3)

Q.106 (4)

Q.107 (3)
Vegetative cell is layer, has irregularly shaped nucleus and stores food reserve.

Q.108 (2)

Q.109 (1)

Q.110 (3)

Q.111 (2)
Nucellus in angiosperms is diploid. MMC differentiates in the micropylar region from the cell of nucellus.

Q.112 **(1)**
Wheat has endospermic seeds.

Q.113 (2)
Seeds of black pepper and beet are perispermic.

Q.114 (1)

Q.115 (2)

Q.116 (2)

Q.117 (4)
The process of formation of microspores from a pollen mother ceil (PMC) through meiosis is called microsporogenesis.

Q.118 (1)
Geitonogamy occurs on monoecious plant.

Q.119 (3)
Epiblast is present in embryo of monocot seeds.

Q.120 (3)
Mucilaginous covering protects the pollens from wetting in hydrophytes.

Q.121 (2)

Q.122 (3)

Q.123 (3)

Q.124 (1)

Q.125 (4)

Q.126 (3)

Q.127 (4)

Q.128 **(2)**

Q.129 (4)

Q.130 (2)

Q.131 (3)

Q.132 (3)

Q.133 (3)
Adequate moisture and temperature O_2 is needed for germination

Q.134 (1)
Guava, orange and mango are the examples of fleshy fruits.

Q.135 (3)

Q.136 (3)
Statement III is correct. Statements I and II are incorrect and can be corrected as
- Pollination by water is quite rare in flowering plants and is limited to about 30 genera, mostly monocotyledons.
- Water is a regular mode of transport for the male gametes among lower plant groups such as algae and bryophytes.

Q.137 (4)
Hydrophilous flowers have mucilage covered pollen.

Q.138 (2)

Q.139 (2)

Q.140 (2)

Q.141 (4)
Synergids are helper cells and they are not directly involved in double fertilisation.

Q.142 (4)

Q.143 (4)
Asteraceae and Poaceae can form seeds without fertilisation by apomixis but when the fruit is formed without fertilisation. It is termed as parthenocarpy.

Q.144 (3)

Q.145 (4)

Q.146 **(4)**
In apple, fruit develops from thalamus along with ovary.

Q.147 (3)

Q.148 (3)

Q.149 (2)

Q.150 (2)
Papaver - Multicarpellary syncarpous ovary.
Wheat - Single ovule per ovary.

Q.151 (4)

Q.152 (4)

Q.153 (4)
Fallopian tube comprises three parts : infundibulum, ampulla and isthmus.

Q.154 (1)

Q.155 (3)
1 oogonia $\rightarrow$ 1 ovum
$\therefore$ 100 oogonia $\rightarrow$ 100 ova

Q.156 (1)
Both Assertion and Reason true, but Reason is not the correct explanation of Assertion.
The correct explanation would be Fimbrae are finger-like projections of infundibulum of the oviduct which is closest to the ovary. Fimbrae collect the released from ovary and move it down into the Fallopian tube.

Q.157 (4)
During first trimester, major organ systems are formed.

Q.158 (2)
Hormones secreted by the placenta to maintain pregnancy are hCG, hPL, progesterone and estrogen.

Q.159 (3)
Endometrium is the innermost layer of uterus.

Q.160 (4)
The embryo with 8 to 16 blastomeres is called a morula.

Q.161 (2)
Fertilisation can only occur if the ovum and sperms are transported dimultaneously to the ampullary region of fallopian tube.

Q.162 (3)

Q.163 (3)
As luteal phase is fixed for 14 days, ovulation will take place on 35-14 = 21^{st} day.

Q.164 (1)

Q.165 (2)
Oxytocin from mother's pituitary.

Q.166 (4)
Interstitial cells secrete androgens.
Leydig cells synthesize and secrete testicular hormones. Sertoli cells secrete inhibin.

Q.167 **(3)**

Q.168 **(3)**
Spermatid conversion into sperm is called spermiogenesis/spermateleosis.

Q.169 (3)

Q.170 (4)

Q.171 (2)

Q.172 (1)

Q.173 (2)

Q.174 (3)
The statement in option (c) is correct.
Rest of the statements are incorrect and can be corrected as
- Size of testis is 4-5 cm in length and 2-3 cm in width.
- The scrotum is maintained at a temperature 2-2,5°C lower than normal body temperature.
- The earliest stages of spermatogenesis occur within the testis.

Q.175 (1)
Each testis has about 250 compartments called testuicular lobules.

Q.176 (4)
In AI, the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI - intro uterine insemination) of the female.

Q.177 (1)
Copper releasing and hormone releasing IUDs are considered as medicated IUDs.

Q.178 (3)
Lactational amernorrhea method i.e., absence of menstruation is based on the fact that ovulation and therefore the cycle do not occur during the period of intense lactation following parturition.

Q.179 (4)
IFT- Zygote Intra-Fallopian Transfer

Q.180 **(3)**
Amniocentesis can be used to test for the presence of certain genetic disorders such as Down's syndrome, haemophilia, sickle-cell anemia, etc.

Q.181 (4)

Q.182 (4)

Q.183 **(2)**
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Q.184 **(4)**
NCERT XI Pg # 64

Q.185 (1)
Q.186 (2)
Q.187 (2)
Q.188 (2)
Q.189 (2)
Q.190 **(3)**
Q.191 **(2)**
Formation of sperms is called spermatogenesis.

Q.192 **(1)**
Estrogen, LH and FSH .are at high level during mid cycle.

Q.193 (1)

Q.194 (3)
Near the nipple, mammary ducts expand to form mammary ampullae where some milk may be stored before going to lactiferous ducts.

Q.195 (2)

Q.196 **(4)**

Q.197 **(3)**
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Q.198 **(2)**

Q.199 (1)

Q.200 (1)