ANSWER KEY
MAJOR TEST (XII)

PHYSICS

Q.1 (4)	**Q.2** (2)	**Q.3** (3)	**Q.4** (1)	**Q.5** (1)	**Q.6** (2)	**Q.7** (3)	**Q.8** (1)	**Q.9** (2)	**Q.10** (3)
Q.11 (1)	**Q.12** (1)	**Q.13** (4)	**Q.14** (2)	**Q.15** (2)	**Q.16** (3)	**Q.17** (2)	**Q.18** (2)	**Q.19** (3)	**Q.20** (2)
Q.21 (1)	**Q.22** (1)	**Q.23** (1)	**Q.24** (4)	**Q.25** (2)	**Q.26** (3)	**Q.27** (4)	**Q.28** (1)	**Q.29** (2)	**Q.30** (1)
Q.31 (4)	**Q.32** (2)	**Q.33** (3)	**Q.34** (3)	**Q.35** (1)	**Q.36** (3)	**Q.37** (3)	**Q.38** (3)	**Q.39** (2)	**Q.40** (2)
Q.41 (1)	**Q.42** (4)	**Q.43** (3)	**Q.44** (1)	**Q.45** (1)					

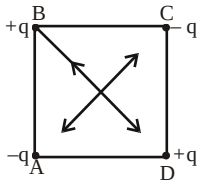
CHEMISTRY

Q.46 (1)	**Q.47** (3)	**Q.48** (2)	**Q.49** (3)	**Q.50** (1)	**Q.51** (1)	**Q.52** (4)	**Q.53** (4)	**Q.54** (1)	**Q.55** (1)
Q.56 (4)	**Q.57** (2)	**Q.58** (2)	**Q.59** (2)	**Q.60** (2)	**Q.61** (4)	**Q.62** (4)	**Q.63** (1)	**Q.64** (4)	**Q.65** (1)
Q.66 (1)	**Q.67** (2)	**Q.68** (4)	**Q.69** (4)	**Q.70** (2)	**Q.71** (4)	**Q.72** (1)	**Q.73** (2)	**Q.74** (4)	**Q.75** (3)
Q.76 (1)	**Q.77** (2)	**Q.78** (1)	**Q.79** (2)	**Q.80** (2)	**Q.81** (2)	**Q.82** (1)	**Q.83** (3)	**Q.84** (2)	**Q.85** (2)
Q.86 (2)	**Q.87** (3)	**Q.88** (1)	**Q.89** (1)	**Q.90** (1)					

BIOLOGY

Q.91 (2)	**Q.92**-(4)	**Q.93** (2)	**Q.94**-(4)	**Q.95**-(3)	**Q.96** (3)	**Q.97**-(4)	**Q.98** (3)	**Q.99**-(1)	**Q.100**-(4)
Q.101-(2)	**Q.102**-(1)	**Q.103** (3)	**Q.104**-(3)	**Q.105** (1)	**Q.106** (2)	**Q.107** (2)	**Q.108** (2)	**Q.109** (2)	**Q.110** (2)
Q.111 (4)	**Q.112** (1)	**Q.113** (3)	**Q.114** (4)	**Q.115** (3)	**Q.116** (4)	**Q.117** (3)	**Q.118** (1)	**Q.119** (4)	**Q.120** (2)
Q.121 (2)	**Q.122** (4)	**Q.123** (1)	**Q.124** (3)	**Q.125** (3)	**Q.126** (2)	**Q.127** (4)	**Q.128** (3)	**Q.129**-(3)	**Q.130**-(1)
Q.131-(1)	**Q.132**-(2)	**Q.133**-(2)	**Q.134** (3)	**Q.135**-(3)	**Q.136** (2)	**Q.137**-(1)	**Q.138**-(3)	**Q.139**-(4)	**Q.140** (1)
Q.141 (2)	**Q.142**-(3)	**Q.143**-(3)	**Q.144** (4)	**Q.145**-(3)	**Q.146** (3)	**Q.147**-(4)	**Q.148** (1)	**Q.149**-(3)	**Q.150**-(4)
Q.151-(4)	**Q.152** (2)	**Q.153** (1)	**Q.154** (4)	**Q.155** (2)	**Q.156** (2)	**Q.157** (2)	**Q.158** (2)	**Q.159** (1)	**Q.160** (3)
Q.161 (1)	**Q.162** (3)	**Q.163** (3)	**Q.164** (1)	**Q.165** (3)	**Q.166** (3)	**Q.167** (4)	**Q.168** (2)	**Q.169** (2)	**Q.170** (2)
Q.171 (2)	**Q.172** (2)	**Q.173**-(1)	**Q.174**-(4)	**Q.175**-(3)	**Q.176** (3)	**Q.177**-(3)	**Q.178** (2)	**Q.179** (2)	**Q.180** (4)

Q.1 (4)

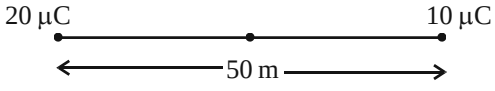


Since $E_{net}=0$, therefore

$\vec{F}_{net} = 0$

Q.2 (2)

Work done , $WD = q\,\Delta V = \Delta U = U_f - U_i$
= Change in electric potential energy
At infinity, U_i = zero
At point P,



$$U_f = \frac{k(20\mu C)(1)}{25} + \frac{k(10\mu C)(1)}{25} = \frac{9\times10^9\times30\times10^{-6}}{25}$$

$$= \frac{54}{5}\times10^3$$

$$= 10.8\times10^3\,J$$

Q.3 (3)

$$R = \frac{I}{I - I_g}R_g$$

$$R = \frac{50\times10^{-6}}{10\times10^{-3} - 50\times10^{-6}}\times100$$

$$R = 0.5\,\Omega$$

Q.4 **(1)**

$$B = \mu_0 nI$$

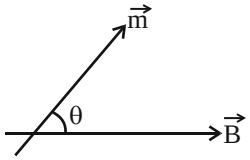
$$I = \frac{B}{\mu_0 n}$$

$$= \frac{4.4\times10^{-3}}{4\pi\times10^{-7}\times2500} = 1.4\,A$$

Q.5 (1)

Torque , $\vec{\tau} = \vec{M}\times\vec{B}$

$$\Rightarrow |\vec{\tau}| = MB\sin\theta$$



$\Rightarrow 3.6\times10^{-5} = M(28.3\times10^{-3})\times\sin 45^\circ$

$\Rightarrow M = 0.179\times10^{-2}$

Q.6 (2)

By theory

Q.7 (3)

$\phi_{\text{Secondary coil}} = Mi_{\text{primary coil}}$

$\Rightarrow \Delta\phi_{\text{secondary coil}} = M\,\Delta i_{\text{primary coil}}$

$\Rightarrow 40 = M(16-0) \Rightarrow M = \frac{40}{16}H$

$\Rightarrow M = 2.5\,H$

Q.8

(1)

Resonating frequency, $f_R = \frac{1}{2\pi}\sqrt{\frac{1}{LC}}$

$\Rightarrow f_R \propto \frac{1}{\sqrt{C}}$

Q.9 (2)

When object is placed between pole and focus, then image formed is virtual, magnified and erect.

Q.10 (3)

$\frac{1}{f_{eq}} = \frac{1}{f_1} + \frac{1}{f_2}$

$\frac{1}{f_{eq}} = \frac{1}{20} + \frac{1}{40}$

$\frac{1}{f_{eq}} = \frac{3}{40} \quad \Rightarrow f_{eq} = \frac{40}{3}\text{cm}$

Q.11 (1)

Shift $= \frac{\Delta\times D}{d}$

$= \frac{(\mu-1)tD}{d} = \frac{(2-1)\times tD}{d}$

$S = \frac{tD}{d}$

and $\beta = \frac{\lambda D}{d}$

$S = \frac{t\beta}{\lambda}$

$S = \frac{t\beta}{\lambda} = \frac{2\times10^{-6}}{4\times10^{-7}}\beta = 5\beta$

Q.12 (1)

$\Delta\lambda = \lambda_B - \lambda_A = \frac{hc}{\phi_B} - \frac{hc}{\phi_A}$

$= \frac{1242}{3} - \frac{1242}{6} = 414 - 207 = 207\,\text{nm}$

Q.13 (4)

$\lambda = \frac{h}{\sqrt{3mKT}}$

$\frac{\lambda_H}{\lambda_{He}} = \sqrt{\frac{m_{HE}T_{He}}{m_H T_H}} = \sqrt{\frac{4(273+327)}{2(273+127)}} = \sqrt{\frac{2(600)}{400}} = \sqrt{3}$

Q.14 (2)

The maximum energy liberated by the Balmer sereis is $n_1 = 2$, $n_2 = \infty$

$E = 13.6\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) = 13.6\times\frac{1}{4}$

$= 3.4\,\text{eV}$

Hence, work function, $\phi = 3.4\text{eV}$ is the maximum work function of the metal.

Q.15 (2)

$E = \Delta mc^2$

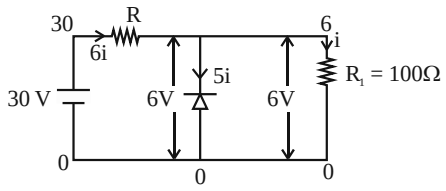
$= 2.5\times10^{-3}\times(3\times10^8)^2$

$E = 22.5\times10^{13}\,J$

Q.16 (3)

Resistivity of a semiconductor decreases with increase in temperature because number of charge carriers increases.

Q.17 **(2)**



$i = \frac{6}{1000} = 6\,\text{mA}$

For R resistor,

$30 - 6 = (6i)\,R$

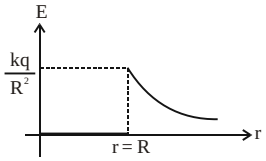
$\Rightarrow 24 = 6 \times (6mA)\,R$

$\Rightarrow \frac{4}{6} \times 1000 = R$

$\Rightarrow R = \frac{2000}{3}\Omega$

Q.18 (2)

variation of electric field, E with distance, r from the centre is

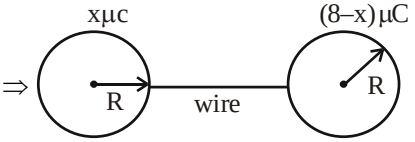


$\Rightarrow$ For $r < R$, $E = 0$

(inside point)

Q.19 (3)

At steady state, potential of both spheres will be equal



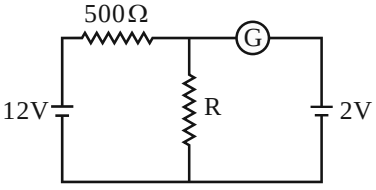
$\frac{kx}{R} = \frac{k(8-x)}{R} \Rightarrow x = 4\mu C$

$\Rightarrow$ Charge flown from A to B is $3\mu C$

Q.20 (2)

Voltage across R = 2V

Hence, voltage across 500W = 10V



Current through $500\Omega = \frac{10}{500} = \frac{1}{50}A$

As 500Ω and $R\Omega$ are in series value of

$R = \frac{V_R}{I_R} = \frac{2}{1/50} = 100\Omega$

Q.21 (1)

$\sigma_i = \frac{\theta}{i} = \frac{\theta}{iG} \cdot G = \sigma_v G \Rightarrow \frac{\sigma_i}{G} = \sigma_v$

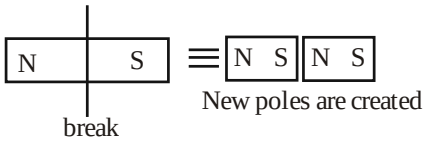
Q.22 (1)

$B_1 = -\frac{\mu_0}{4\pi}\frac{i}{R} + \frac{\mu_0 i}{4R} + \frac{\mu_0}{4\pi}\frac{i}{R}$

$B_2 = -\frac{\mu_0 i}{4R}$

$B_3 = -\frac{\mu_0 I}{2R} \times \frac{3}{4} + \frac{\mu_0 I}{4\pi R}$

Q.23 (1)



Magnetic moment, $M = m \times \ell$

As length is halved

$\Rightarrow$ magnetic mometn is halved

Q.24 (4)

$e = \frac{d\phi}{dt} = \frac{d(BA)}{dt}; -B\pi\frac{2rdr}{dt} = 6.4\pi \times 10^{-6} V$

Q.25 (2)

Watt less current = $I_{rms} \sin\theta$

$P = V_{rms} I_{rms} \cos\theta$

Q.26 (3)

$\frac{\text{Power}}{\text{Area}} = \text{Intensity}$

$\text{Energy density} = \frac{\text{Intensity}}{\text{Speed of wave}}$

$\Rightarrow \frac{1}{2}\frac{B_0^2}{\mu_0} = \frac{9240}{3\times10^8} \Rightarrow B_0^2 = 7.73\times10^{-11}$

$\Rightarrow B_0 = 8.8\,\mu T$

Q.27 (4)

$\sin C = \left(\frac{V_D}{V_R}\right) = \frac{1.8\times10^8}{2.4\times10^8} = \frac{3}{4}$

Q.28 (1)

$\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

$\Rightarrow \frac{1}{\lambda} = R(1)\left(\frac{1}{1} - \frac{1}{25}\right)$

$$\Rightarrow \frac{1}{\lambda} = R\frac{24}{25} \Rightarrow \lambda = \frac{25}{24R}$$

Q.29 (2)

$${}_{z}X^{A} \xrightarrow{\gamma-\text{decay}} {}_{z}Z^{A}$$

Due to gamma emission, there is no change in mass number ana atomic number.

Q.30 (1)

Photo diode detect light when

$$\Delta Eg \le \frac{\lambda_c}{\lambda}$$

$$\Delta Eg \le \frac{12400}{6000}$$

$$\Delta Eg \le 2.06eV$$

Q.31 (4)

From Gauss's law

$$\phi_{Net} = \frac{q_{inside}}{\varepsilon_0}$$

Flux through surface $A = \phi_A = \frac{-7q + 4q}{\varepsilon_0}$

$$\Rightarrow \phi_A = \frac{-3q}{\varepsilon_0}$$

Flux through surface $B = \phi_B = \frac{5q - q}{\varepsilon_0} = \frac{4q}{\varepsilon_0}$

$$\Rightarrow \frac{\phi_A}{\phi_B} = \frac{-3}{4}$$

Q.32 (2)

$q_0 = C_{eff} V$

$= 1 \times 10 = 10\mu C$

$$U = \frac{1}{2}\frac{Q^2}{C}$$

$$= \frac{1}{2} \times \frac{10\times10^{-6}\times10\times10^{-6}}{2\times10^{-6}} J = 25\,\mu J$$

Q.33 (3)

Apply KCL in the circuit :

$i_{entry} = i_{exit}$

$2 + i = 1 + 2 + 3$

$i = 4A$

Q.34 (3)

Magnetic field due to an infinite wire

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

$$B = \frac{4\pi\times10^{-7}\times80}{2\pi\times2} = 8\mu T$$

Using right hand thumb rule, the direction of magnetic field comes out to be from west to east.

Q.35 (1)

$$\tan\phi = \frac{V_L - V_C}{V_R} = \frac{150-50}{100\sqrt{3}}$$

$$\tan\phi = \frac{100}{100\sqrt{3}} = \frac{1}{\sqrt{3}}$$

$$\phi = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right) = 30^o$$

Q.36 (3)

For first minima $y_1 = \frac{\lambda D}{d}$

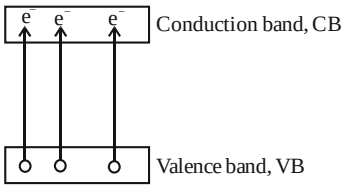
and for fifth minima $y_5 = \frac{5\lambda D}{d}$

$\Delta x = y_5 - y_1 = \frac{4\lambda D}{d} = 0.4\times10^{-3}$

$$\Rightarrow d = \frac{4\times5000\times10^{-10}\times1}{4\times10^{-4}}$$

$d = 5\,mm$

Q.37 **(3)**

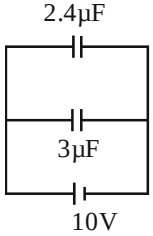


Due to increase in temperature, more electrons jump from VB to CB.

So, no. of holes increases in VB and no. of electrons increases in CB-

Q.38 (3)

$q = cv$



$= 10 \times 2.4 = 24\mu C$

CHEMISTRY

Q.39 (2)

Resistance of conductor, $R = \frac{\rho \ell}{A} \Rightarrow A = \frac{\rho \ell}{R}$

$\Rightarrow \frac{A_1}{A_2} = \frac{\rho_1}{\rho_2} \times \frac{\ell_1}{\ell_2} \times \left(\frac{R_2}{R_1}\right) = 1$

$[\because R_1 = R_2, \ell_1 = \ell_2$ and for same material $\rho_1 = \rho_2]$

Q.40 (2)

$r = \frac{\sqrt{2mKE}}{qB} \Rightarrow r \propto \frac{\sqrt{m}}{q}$

Q.41 (1)

$V_{avg} = \frac{\int_0^T V\,dt}{\int_0^T dt} = \frac{\text{Area}}{T} = \frac{V_0 \frac{T}{2}}{T} = \frac{V_0}{2}$

$V_{rms} = \sqrt{\frac{\int_0^T V^2 dt}{\int_0^T dt}} = \sqrt{\frac{V_0^2 \frac{T}{2}}{T}} = \frac{V_0}{\sqrt{2}}$

Q.42 **(4)**

Q.43 The threshold wavelength $\lambda_0 = \frac{hc}{\phi}$

$(\because \phi = h\nu_0 = hc/\lambda_0)$

& $hc = 1.24 \times 10^{-6}$ (eV) m

$\lambda_0 = \frac{1.24 \times 10^{-6}}{2.3}$ m ;

$\lambda_0 = 0.539 \times 10^{-6}$ m = 539 nm

Q.44 (1)

$\left(n^2 = \frac{13.6}{1.5} \Rightarrow n^2 = 9\right) \therefore n = 3$

for 1.5 eV, n = 3

Angular momentum = $n \frac{h}{2\pi}$

$= \frac{3 \times 6.6 \times 10^{-34}}{2 \times 3.14} = 3.15 \times 10^{-34}$ J -sec

Q.45 (1)

Q.46 (1)

Molarity of Cl^- = $\frac{\text{mol of } Cl^-}{\text{vol. of solution(L)}}$

$= \frac{3.01 \times 10^{22}}{6.02 \times 10^{23} \times 0.5} = 0.1$ M

$CaCl_2 \rightarrow Ca^{2+}\ Cl^-$

Molarity of $CaCl_2 = \frac{1}{2} \times$ molarity of Cl^-

$= \frac{1}{2} \times 0.1 = 0.05$ M

Q.47 (3)

On electrosysis same amount of charge can deposite same equivalent of Cu and Fe but not same mass.

Q.48 (2)

mass to be deposited = density × volume

$= (9 \times 1 \times 2 \times 0.01)$

$= 0.18$ g

$W_g = Z \times i \times t$

$t = \frac{W_g}{Z \times i} = \frac{0.18}{0.0003 \times 1.5}$

t = 400 sec.

to deposit on both side

$t = 2 \times 400 = 800$ sec.

Q.49 (3)

For zero order reaction

$[A]_t = [A]_0 - kt$

$t_{99} = \frac{100 - 1}{K} = \frac{99}{K} = 99$ min.

$t_{90} = \frac{100 - 10}{K} = \frac{90}{K} = \frac{90 \times 99}{99} = 90$ min.

Q.50 (1)

Q.51 (1)

Boiling point of HX is

HF > HI > HBr > HCl

Q.52 (4)

Preparation of polyethylene is done in the presence of the "*Zeigler-Natta* catalyst" which is a mixture of trimethylaluminium $[Al(CH_3)_3]$ and titanium tetrachloride $(TiCl_4)$.

Q.53 (4)

$[Co(NH_2CH_2CH_2NH_2)_2Br_2]Br$

dibromido bis (ethylene diamine) cobalt (III) bromide

Q.54 (1)

$[Ni(H_2O)_6]^{2+}_{(aq)} + en_{(aq)} \rightarrow [Ni(H_2O)_4(en)]^{2+}$

Pale blue

$[Ni(H_2O)_6]^{2+} + 2en \rightarrow [Ni(H_2O)_2(en)_2]^{2+}$

Blue/purple

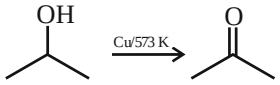
$[Ni(H_2O)_6]^{2+} + 3en \rightarrow [Ni(en)_3]$

Violet

Q.55 (1)

Rate for $SN^1 \propto$ stability of carbocation.

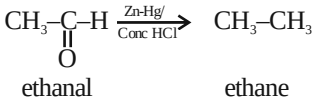
Q.56 (4)



Q.57 **(2)**

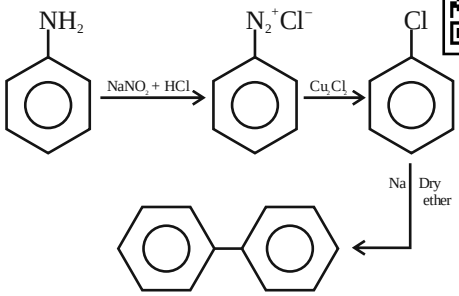
Conceptual

Q.58 (2)



ethanal ethane

Q.59 (2)



Q.60 (2)

$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} 2C_2H_5OH + 2CO_2$

Q.61 (4)

In titration equivalence point is a point where the chemical comes to an end, while the end point is the point where colour change occurs; so both point may not coincide.

Q.62 (4)

C_6H_6 and $C_6H_5CH_3$ both belong to aromatic hydrocarbon, so they can form an ideal solution.

Q.63 (1)

$$W = \frac{GAM \times i \times t}{v.f. \times F}$$

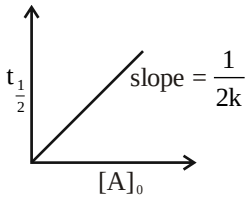
$$W = \frac{27 \times 10 \times 1.608 \times 60}{3 \times 96500}$$

W = 0.09 g

Q.64 (4)

For zero order reaction,

$$t_{\frac{1}{2}} \propto [A_0] \Rightarrow t_{\frac{1}{2}} = \frac{A_0}{2k}$$



Q.65 **(1)**

B.D.E. $\rightarrow F_2 < Cl_2 > Br_2 > I_2$

F_2 has low B.D.E. due to *lp-lp* repulsion of fluorine atoms.

Q.66 (1)

Transition elements have higher enthalpies of atomisation due to presence of large no. of unpaired electrons which facilitate strong bonding between atoms.

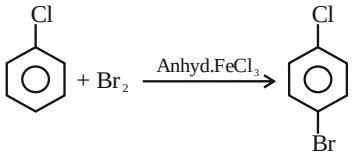
Q.67 (2)

Crystal field theory considered ligands as point charges but does not explain it. But, it explain the formation and structure of the complexes,

colour and their magnetic properties. Covalent character of metal-ligand bonding was not explained. It considered them as point charges. Thus, explaining ionic character only.

Thus, CFT explained II, III and IV statements only.

Q.68 (4)



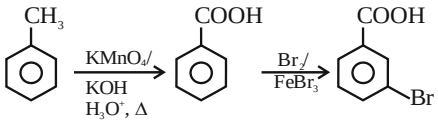
Q.69 (4)

Colour of bromine water decolourised, if reactant contains unsaturation. [C_2H_4 is an alkene]

Q.70 (2)
Fehling test is only given by aliphatic aldehyde.

Q.71 (4)
It is carbyl amine reaction
(Hoffman isocyanide test)

Q.72 (1)



Q.73 (2)
Monosaccharides can not be hydrolysed.
All monosaccharides are reducing sugars.

Q.74 (4)
Fact

Q.75 (3)
Value of K_H for a particular gas is directly proportional to solubility of gas.

Q.76 (1)

$E_a^f = 60\,kJmol^{-1}$

$\Delta H = -20\,kJ\,mol^{-1}$

$\Delta H = E_a^f - E_a^b$

$E_a^b = E_a^f - \Delta H$

$= 60 - (-20)$

$E_a^b = 80\,kJ\,mol^{-1}$

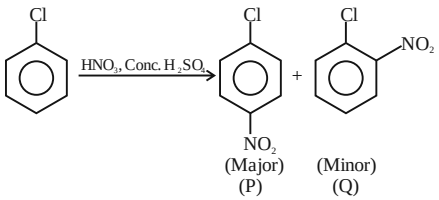
Q.77 (2)
MnO_4^{2-} and CrO_4^{2-} both behave as strong oxidising agent.

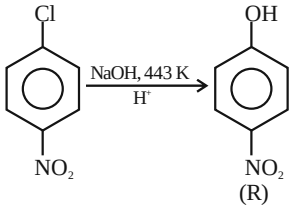
Q.78 **(1)**
CuI_2 is unstable. In this case Cu^{+2} oxidises I^- to I_2.

$2Cu^{+2} + 4I^- \rightarrow Cu_2I_2(s) + I_2$

Q.79 (2)
Complex show's only optical isomerism.

Q.80 **(2)**





Q.81 (2)
Fact

Q.82 (1)
Fact

Q.83 (3)
In titration of $KMnO_4$ v/s oxalic acid, $KMnO_4$ is used as self indicator, because $KMnO_4$ decolourise the solution purple to colourless.

Q.84 (2)

$\kappa = 0.012\ ohm^{-1}\,cm^{-1}$

$N = 0.1\ N$

$R = 55\ ohm$

$$\kappa = \frac{G^*}{R}$$

$G^* = \kappa \times R = 0.012 \times 55$

$G^* = 0.66\,cm^{-1}$

Q.85 (2)

$A_0 = A_t \times 2^n$

$n \rightarrow$ no of half life

$$n = \frac{8000}{2000} = 4$$

$\Delta_0 = 0.02 \times 2^4$

$\Delta_0 = 0.32\ M$

Q.86 **(2)**
Due to comparable energies of 5f, 6d and 7s orbitals they have greater range of oxidation states.
+ 3 and +4 ions of these elements tend to hydrolyse.

Q.87 **(3)**

$2KMnO_4 \rightarrow K_2MnO_4 + MnO_2 + O_2$

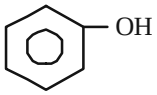
Q.88 (1)

$[Ni(NH_3)_4(H_2O)_2]^{+2}$

$Ni^{+2} \rightarrow 3d^8 \rightarrow t_{2g}^6 e_g^2$ sp^3d^2 hybridisation

Q.89 (1)

Y is $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

X is 

Ketone does not give silver mirror and benedict test but it can react with $NaHSO_3$.

Q.90 (1)

$CH_3-COOH \xrightarrow{LiAlH_4} \underset{[X]}{CH_3CH_2OH} \xrightarrow[573\,K]{Cu} \underset{[Y]}{CH_3CHO} \xrightarrow{\text{dil NaOH}} \underset{\underset{OH}{|}}{\underset{|}{CH_3-CH}-CH_2CHO}$ [Z]

aldol

BIOLOGY

Q.91 (2) 15/16

New NCERT Pg. No. 63, Class XII

In a typical Mendelian dihybrid cross, the ratio of pea seeds having at least one dominant allele in F_2 generation is 15/16.

Q.92 (4)

New NCERT Pg. No. 20, 21, Class XII

Coconut is a true fruit, not a false fruit. It is a drupe fruit.

Q.93 (2)

New NCERT Pg. No. 185, Class XII

There are 27 documented varieties of Basmati rice grown in India.

Q.94 (4)

New NCERT Pg. No. 153, Class XII

Statins produced by the yeast *Monascus purpureus* have been commercialised as blood-cholesterol lowering agents.

Cyclosporin A, that is used as an immunosuppressive agent in organ-transplant patients, is produced by the fungus *Trichoderma polysporum*.

Streptococcus and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

Lipases are used in detergent formulations and are helpful in removing oily stains from the laundry.

Q.95 (3)

New NCERT Pg. No. 65, 71, Class XII

Walter Sutton and Theodore Boveri noted that the behaviour of chromosomes was parallel to the behaviour of genes and used chromosome

movement to explain Mendel's laws. Recall that you have studied the behaviour of chromosomes during mitosis (equational division) and during meiosis (reduction division).

Honey bee do not have father and thus cannot have sons, but have a grandfather and can have grandsons.

Q.96 (3)

New NCERT Pg. No. 172, Class XII

Amplification of DNA is done by polymerase chain reaction (PCR).

Q.97 (4)

New NCERT Pg. No. 197, Class XII

Commensalism is a type of population interaction where one species benefits while the other is neither harmed nor benefited. Examples include barnacles on whales.

Q.98 (3)

New NCERT Pg. No. 217, Class XII

The variation in potency and concentration of active chemicals in *Rauwolfia vomitoria* in different

Himalayan ranges is an example of genetic diversity, reflecting the genetic variation within a species.

Q.99 (1)

New NCERT Pg. No. 106, Class XII

The correct sequential steps of DNA fingerprinting are:

- Isolation of DNA (b),
- Digestion of DNA by restriction endonucleases (d),
- Separation of DNA fragments by electrophoresis (c),
- Transferring (blotting) of separated DNA fragments to synthetic membranes (a),
- Hybridisation using labelled VNTR probe (f),
- Detection of hybridised DNA fragments by autoradiography (e).

Q.100 (4)

New NCERT Pg. No. 225, Class XII

Sarguja, Chanda, and Bastar are not in Gujarat; they are regions in MP known for their sacred groves.

Q.101 (2)

New NCERT Pg. No. 182, Class XII

The first successful clinical gene therapy was given to a four-year-old girl with a deficiency of adenosine deaminase (ADA).

Q.102 (1)

New NCERT Pg. No. 225, Class XII

Zoological parks, botanical gardens, and wildlife safari parks serve the purpose of ex-situ conservation of threatened animals and plants, and ex-situ conservation has advanced beyond keeping species in enclosures.

Q.103 (3)

New NCERT Pg. No. 74, Class XII

For one daughter to be a carrier and one son to be haemophilic, the mother must be a carrier (XX^h) and the father normal (XY).

Q.104 (3)

New NCERT Pg. No. 168, Class XII

During gel electrophoresis, DNA fragments are separated based on size because smaller fragments move faster through the gel matrix.

Q.105 (1)

New NCERT Pg. No. 183, Class XII

Transgenic animals are not used in conventional methods of disease diagnosis but are used in research, drug testing, and production of biological products.

Q.106 (2)

New NCERT Pg. No. 69, Class XII

Polygenic inheritance involves multiple genes contributing to a single trait, and the phenotype is a

result of the cumulative effect of all alleles, both dominant and recessive, rather than just dominant alleles. In a polygenic trait the phenotype reflects the contribution of each allele, i.e., the effect of each allele is additive.

Q.107 (2)

New NCERT Pg. No. 12, Class XII

- Statements A, B, and D correctly describe aspects of pollination.
- Statement E is incorrect as majority of plants use biotic (not abiotic) agents for pollination.

Q.108 (2)

New NCERT Pg. No. 225, Class XII

India has 4 biodiversity hotspots, not 20. The other numbers provided for biosphere reserves, national parks, and wildlife sanctuaries are correct as per the NCERT.

Q.109 (2)

New NCERT Pg. No. 153, Class XII

Cyclosporin A is an immunosuppressive agent used in organ transplant patients, produced by the fungus *Trichoderma polysporum*.

Q.110 (2)

New NCERT Pg. No. 74, Class XII

Haemophilia is a sex-linked recessive disease because it's gene is present on X chromosome. It affects the clotting cascade protein, making both the assertion and reason correct.

Q.111 (4)

New NCERT Pg. No. 169, Class XII

The gene of interest is inserted at the BamHI site within the tetracycline resistance gene in vector pBR322. Therefore, recombinants can be selected by their inability to grow on a tetracycline-containing medium.

Q.112 (1)

New NCERT Pg. No. 61, Class XII

Allele from Parent 1	Allele from Parent 2	Genotype of offspring	blood types of offspring
I^A	I^A	$I^A I^A$	A
I^A	I^B	$I^A I^B$	AB
I^A	i	$I^A i$	A
I^B	I^A	$I^A I^B$	AB
I^B	I^B	$I^B I^B$	B
I^B	i	$I^B i$	B
i	i	$i\,i$	O

Q.113 (3)

New NCERT Pg. No. 193, Class XII

Immigration refers to the arrival of individuals of the same species into a population from elsewhere, not individuals of different species.

Q.114 (4)

New NCERT Pg. No. 81, Class XII

If guanine makes up 32% of the DNA, then cytosine also makes up 32% because of complementary base pairing. This leaves 36% for adenine and thymine combined, with each constituting 18%.

Q.115 (3)

New NCERT Pg. No. 225, Class XII

The historic convention of biological diversity ('The Earth Summit') held in Rio de janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilization of its benefits.

Q.116 (4)

New NCERT Pg. No. 100, Class XII

- The lac operon consists of one regulatory gene and three structural genes (z, y, and a). The i gene codes for the repressor of the lac operon.
- The z gene codes for beta-galactosidase (β-gal), which is primarily responsible for the hydrolysis of the disaccharide, lactose into its monomeric units, galactose and glucose.
- The y gene codes for permease, which increases permeability of the cell to β-galactosides.
- The a gene encodes a transacetylase.

Q.117 (3)

New NCERT Pg. No. 221, Class XII

The correct matches are: Quagga - Africa, Thylacine - Australia, Dodo - Mauritius, Steller's sea cow - Russia.

Q.118 (1)

New NCERT Pg. No. 182, Class XII

Mature insulin consists of two chains, A and B, linked by two disulphide bonds, and an additional disulphide bond within the A chain.

Q.119 (4)

New NCERT Pg. No. 219, Class XII

India has about 8.1% of the world's biodiversity, reflecting its vast array of ecosystems and species.

Q.120 (2)

New NCERT Pg. No. 68, Class XII

T.H. Morgan's dihybrid cross experiments on *Drosophila* showed a 1.3% recombination frequency for the traits yellow body and white eyes.

Q.121 (2)

New NCERT Pg. No. 170, Class XII

Recombinant bacteria appear white because the insertion of foreign DNA inactivates the β-galactosidase gene, preventing the breakdown of X-gal into a blue product.

Q.122 (4)

New NCERT Pg. No. 182, Class XII

The permanent cure for ADA deficiency involves gene therapy, where the functional ADA gene is introduced into early embryonic cells.

Q.123 (1)

Point mutation occur due to change in a single base pair of DNA

Q.124 (3)

New NCERT Pg. No. 207, Class XII

Detritivores (e.g., earthworm) break down detritus into smaller particles.

This process is called fragmentation. By the process of leaching, watersoluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts. Bacterial and fungal enzymes degrade detritus into simpler inorganic substances. This process is called as catabolism.

Q.125 (3)

New NCERT Pg. No. 93, Class XII

The catalytic RNA molecule (ribozyme) used during prokaryotic translation is transcribed by DNA-dependent RNA polymerase.

Q.126 (2)

New NCERT Pg. No. 20, Class XII

Mango is a true fruit developed from the ovary, whereas cashew nut, apple, and strawberry are false fruits derived from other floral parts.

Q.127 (4)

New NCERT Pg. No. 180, Class XII

The cryIAb gene in Bt crops encodes a protein that controls infestation by the corn borer, a significant pest in maize cultivation.

Q.128 (3)

New NCERT Pg. No. 222, 223, Class XII

The cutting and clearing of the Amazon rain forest for soyabean cultivation is an example of habitat loss and fragmentation, one of the key factors in biodiversity loss.

Q.129 (3)

The RNA polymerase II transcribes the precursor of mRNA i.e., hnRNA.

New NCERT Pg. No. 95, Class XII

RNA polymerase II transcribes hnRNA (heterogeneous nuclear RNA), which is the precursor to mRNA in eukaryotes.

Q.130 (1)

New NCERT Pg. No. 100, Class XII

In *Escherichia coli*, the product of *i* gene (repressor protein) combines with operator gene to switch off structural genes.

Q.131 (1)

New NCERT Pg. No. 12, 14, Class XII

Yucca and Pronuba moth show obligate mutualism. Cleistogamous flowers produce assured seed set even without pollinators.

Water-hyacinth and water lily are not pollinated by water; they are insect-pollinated.

Q.132 (2)

New NCERT Pg. No. 184, Class XII

The Genetic Engineering Approval Committee (GEAC) is responsible for making decisions regarding the validity and safety of GM research and the release of GM organisms for public use.

Q.133 (2)

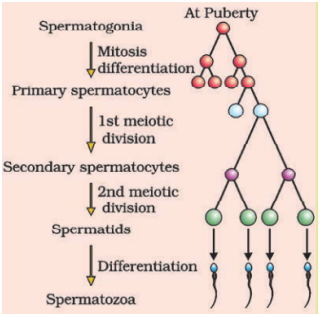
New NCERT Pg. No. 217, Class XII

Rauwolfia vomitoria growing in different Himalayan ranges might be in terms of the potency and concentration of the active chemical (reserpine) that the plant produces. India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango.

Q.134 (3)

Q.135 (3)

New NCERT Pg. No. 33, Class XII



Q.136 (2)

New NCERT Pg. No. 124, Class XII

Fossils discovered in 1891 in Java revealed the hominid fossil named homo erectus.

Q.137 (1)

New NCERT Pg. No. 44, Class XII

Periodic abstinence or rhythm method is the natural method for contraception.

Q.138 (3)

New NCERT Pg. No. 179, Class XII

Bt-toxin gets activated in the alkaline gut of insect upon ingestion by it.

Q.139 (4)

New NCERT Pg. No. 38, Class XII

Foetal ejection reflex is induced by fully developed foetus and placenta.

Q.140 (1)

New NCERT Pg. No. 92, Class XII

The sequence given matches with the sequence required for the formation of mRNA. The complementary strand will be used to transcribe mRNA.

Q.141 (2)

New NCERT Pg. No. 28, Class XII

In humans, birth canal is formed by cervical canal along with the vagina.

Q.142 (3)

New NCERT Pg. No. 34, Class XII

LH induces ovulation and stimulates the formation of corpus luteum.

Q.143 (3)

New NCERT Pg. No. 111, Class XII

The experiment conducted by S.L. Miller was replica of the conditions present on primitive earth. The atmosphere was reducing on early earth.

Q.144 (4)

New NCERT Pg. No. 130, Class XII

Rheumatoid arthritis is an autoimmune disorder tetanus is a bacterial disease.

Q.145 (3)

New NCERT Pg. No. 131, 132, 133 Class XII

Common cold – virus
Elephantiasis – helminth
Amoebiasis – protozoan
Pneumonia – bacteria

Q.146 (3)

New NCERT Pg. No. 131, Class XII

Hint: Infective stage of *Plasmodium* for humans

Plasmodium reproduces asexually in liver cells and RBCs of human host. Gametocytes are formed in human RBCs. Fertilisation takes place in lumen of stomach of mosquito. Mature infective stages (sporozoites) escape from gut and migrate to the mosquito's salivary glands.

Q.147 (4)
New NCERT Pg. No. 166, 170, Class XII
Sticky ends facilitates the action of enzyme DNA ligase.

Q.148 (1)
New NCERT Pg. No. 119, Class XII
Use and disuse of organs – Lamarck
Survival of fittest – Charles Darwin
Chemical evolution – Oparin and Haldane
Essay on population – Thomas Malthus

Q.149 (3)
New NCERT Pg. No. 169, Class XII
In order to link alien DNA, the vector needs to have single recognition site for the commonly used restriction enzymes. Multiple cloning sites will complicate the gene cloning process.

Q.150 (4)
New NCERT Pg. No. 48, Class XII
In gamete intra fallopian transfer, GIFT, in-vivo fertilisation takes place.

Q.151 (4)
New NCERT Pg. No. 169, Class XII
If an alien DNA is inserted at site Pst I of cloning vector pBR322, ampicillin-resistance is lost.

Q.152 (2)
New NCERT Pg. No. 27, Class XII
The testis are situated outside the abdominal cavity within a pouch called scrotum.
The scrotum helps in maintaining the low temperature i.e. 2-2.5°C lower than internal body temperature necessary for spermatogenesis.

Q.153 (1)
New NCERT Pg. No. 44, Class XII
Nirodh is a popular brand of condoms used by males for contraception.

Q.154 (4)
New NCERT Pg. No. 224, Class XI
Cranial bones $\rightarrow$ 8
Facial bones $\rightarrow$ 14
Skull bones $\rightarrow$ 29
Ribs $\rightarrow$ 24

Q.155 (2)
New NCERT Pg. No. 179, Class XII
Bt-toxin present in inactive form as a pro-toxin gets activated in the gut of insect having alkaline pH.

Q.156 (2)
New NCERT Pg. No. 81, Class XI
According to Watson and Crick model of DNA, the two strands of DNA are antiparallel. One strand is oriented as 5' $\rightarrow$ 3' and other is 3' $\rightarrow$ 5'.

Q.157 (2)
New NCERT Pg. No. 34, Class XII
In humans, during ovulation, progesterone is not present. It is released from corpus luteum formed after ovulation.

Q.158 (2)
New NCERT Pg. No. 32, Class XII
In human females, during oogenesis, primary oocyte starts meiotic division but gets arrested at prophase-I diplotene stage.

Q.159 (1)
New NCERT Pg. No. 113, Class XII
Alfred Wallace worked in Malay Archipelago and came to similar conclusions as Darwin who worked on Galapagos Island (off coast to South America).

Q.160 (3)
New NCERT Pg. No. 143, Class XII
Drug obtained from plant *Erythroxylum coca* i.e., Cocaine interferes with the transport of the neurotransmitter, dopamine.

Q.161 (1)
New NCERT Pg. No. 142, Class XII
α-interferons are given to cancer patients in immunotherapy.

Q.162 (3)
New NCERT Pg. No. 59, Class XII
According to Mendel's law of segregation, factors or alleles of a pair segregate from each other.

Q.163 (3)
New NCERT Pg. No. 141, Class XII
Computed tomography uses x-rays to generate a 3-D image of the internals of an object. Strong magnetic fields are used in magnetic resonance imaging to detect cancer.

Q.164 (1)
New NCERT Pg. No. 164, Class XII
For the multiplication of any alien piece of DNA in the host cell, it should become part of the chromosome having specific sequence called origin of replication for initiating replication of DNA.

Q.165 (3)
New NCERT Pg. No. 116, Class XII
Before industrialisation, the count of melanised moth was low because their predation was high.
Light coloured lichen was present on dark coloured trunk of trees leading to their easy spotting by birds.

Q.166 (3)
New NCERT Pg. No. 168, Class XII
Elution is the process of extracting DNA from the gel piece after separation by agarose - gel electrophoresis.

Q.167 (4)
New NCERT Pg. No. 137, Class XII
Allergy is due to the release of certain chemicals like histamine and serotonin from mast cells.

Q.168 (2)
New NCERT Pg. No. 115, Class XII
Thorns of *Bougainvillea* and tendrils of *Cucurbita* are homologous organs that have evolved due to divergent evolution.

Q.169 (2)
New NCERT Pg. No. 197, 198, 199, Class XII
Matching the items:
- Mycorrhiza - Mutualism,
- Ticks on dogs - Parasitism,
- Tiger and deer - Predation,
- Orchids and mango tree - Commensalism.

Q.170 (2)
New NCERT Pg. No. 84, Class XII
Griffith's experiment demonstrated that a substance from heat-killed virulent bacteria could transform non-virulent bacteria into virulent forms, indicating that DNA is the transforming principle.

Q.171 (2)
New NCERT Pg. No. 27, Class XII
Sertoli cells – Nutrition to the germ cells
Leydig cells – Testicular hormones
Epididymis – Male accessory duct
Urethral meatus – External opening of urethra

Q.172 (2)
New NCERT Pg. No. 73, 74, 75, 76, Class XII
- Phenylketonuria – Autosomal recessive trait.
- Colour blindness – Sex linked recessive,
- Turner's syndrome - aneuploidy,
- Myotonic dystrophy - Autosomal dominant trait.

Q.173 (1)
New NCERT Pg. No. 136, Class XII
Colostrum contains IgA. It is an example of naturally acquired passive immunity.

Q.174 (4)
New NCERT Pg. No. 116, Class XII
In industrial melanism,
Before industrialisation, lichens were present.
White winged moth >> melanised moth
After industrialisation, lichens disappeared
Melanised moth >> white winged moth

Q.175 (3)
New NCERT Pg. No. 83, Class XII
A nucleosome is formed when a negatively charged DNA is coiled around a histone octamer.

Q.176 (3)
New NCERT Pg. No. 30, Class XII
In uterus of a female layers present are :
Outside – Perimetrium
Middle – Myometrium
Inner – Endometrium

Q.177 (3)
New NCERT Pg. No. 74, Class XII
Haemophilia is a genetic disorder where blood doesn't clot normally due to lack of sufficient blood-clotting proteins.
It is an X-linked recessive trait, which means it is passed on the X chromosome. Affected males cannot have affected sons.

Q.178 (2)
New NCERT Pg. No. 48, Class XII
The zygote or early embryos with upto 8 blastomeres are transferred to the fallopian tube via ZIFT.

Q.179 (2)
New NCERT Pg. No. 164, Class XII
In pBR322, ori is responsible for controlling the copy number of linked DNA as well as for initiating the replication.

Q.180 **(4)**
New genes are added to a new population and lost from the old population. If this change occurs by chance it is called genetic drift.