ANSWER KEY
FULL TEST-05

PHYSICS

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

CHEMISTRY

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

BIOLOGY

Q.91 (2)	**Q.92** (4)	**Q.93** (3)	**Q.94 (1)**	**Q.95** (2)	**Q.96** (1)	**Q.97** (2)	**Q.98** (3)	**Q.99** (1)	**Q.100** (3)
Q.101 (4)	**Q.102** (4)	**Q.103** (1)	**Q.104** (2)	**Q.105** (4)	**Q.106** (2)	**Q.107** (2)	**Q.108** (3)	**Q.109** (1)	**Q.110** (2)
Q.111 (4)	**Q.112** (3)	**Q.113** (3)	**Q.114** (4)	**Q.115** (2)	**Q.116** (1)	**Q.117** (4)	**Q.118** (3)	**Q.119** (3)	**Q.120** (2)
Q.121 (2)	**Q.122** (3)	**Q.123** (1)	**Q.124** (1)	**Q.125** (3)	**Q.126** (4)	**Q.127** (3)	**Q.128** (2)	**Q.129** (1)	**Q.130** (4)
Q.131 (4)	**Q.132** (2)	**Q.133** (2)	**Q.134** (1)	**Q.135** (1)	**Q.136** (2)	**Q.137** (2)	**Q.138** (4)	**Q.139** (3)	**Q.140** (1)
Q.141 (1)	**Q.142** (4)	**Q.143** (4)	**Q.144** (4)	**Q.145** (4)	**Q.146** (1)	**Q.147** (1)	**Q.148** (3)	**Q.149** (2)	**Q.150** (1)
Q.151 (4)	**Q.152** (3)	**Q.153** (4)	**Q.154** (2)	**Q.155** (1)	**Q.156** (3)	**Q.157** (1)	**Q.158** (2)	**Q.159** (1)	**Q.160** (1)
Q.161 (3)	**Q.162** (1)	**Q163** (2)	**Q.164** (4)	**Q.165** (4)	**Q.166** (2)	**Q.167** (3)	**Q.168** (1)	**Q.169** (1)	**Q.170** (4)
Q.171 (4)	**Q.172** (2)	**Q.173** (4)	**Q.174** (1)	**Q.175** (2)	**Q.176** (2)	**Q.177** (3)	**Q.178** (2)	**Q.179** (2)	**Q.180** (1)

Hints & Solutions

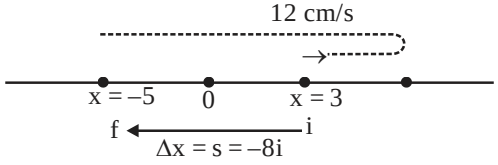
Q.1 (2)

$[a] = [L^2]$

$b = \dfrac{[L^2]}{[P][t]}$ (P = Power)

$b = \dfrac{[L^2]}{[M^1L^2T^{-3}][T^1]} = [M^1\,L^0\,T^2]$

Q.2 (1)



$s = ut + \dfrac{1}{2}at^2$

$-8 = 12(2) + \dfrac{1}{2}a(2)^2$

$-8 = 24 + 2a$

$a = \dfrac{-32}{2} = -16\,cm/s^2\,\hat{i}$

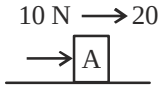
Q.3 (3)

$\vec{V}_{bw} = \vec{V}_b - V_w$

$= 3\hat{i} + 4\hat{j} - [-3\hat{i} - 4\hat{j}]$

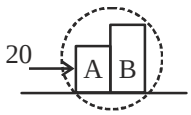
$= 6\hat{i} + 8\hat{j}$

Q.4 (1)



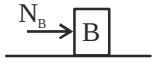
$F = m_A\,a$

$m_A = \dfrac{F}{a} = \dfrac{10}{20} = 0.5kg$



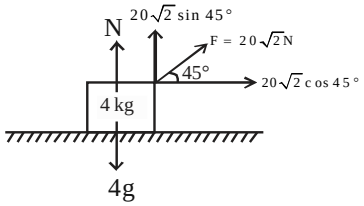
$F_{net} = (m_A + m_B)\,a$

$a = \dfrac{20}{0.5+1.5} = 10\ m/s^2$



$N_B = m_Ba = (1.5) \times 10 = 15\ N$

Q.5 (3)



$$N + 20\sqrt{2} \times \frac{1}{\sqrt{2}} = 4g$$

$N = 20N$

$f_L = \mu_s N$

$f_k = \mu_k N$

$f_L = 20 \times 0.8 = 16$ N

$f_k = 20 \times 0.6 = 12$ N

Pulling force (F)

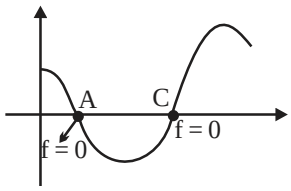
$$= 20\sqrt{2} \times \frac{1}{\sqrt{2}} = 20N$$

$$a = \frac{F - F_k}{m} = \frac{20-12}{4} = 2 \text{ m/s}^2$$

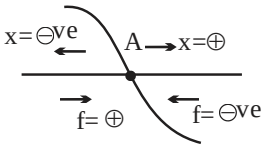
Q.6 (2)

Since the particle moves with constant speed hence the direction of acceleration vector cannot be $\vec{a}_3$ and $\vec{a}_1$ it will be perpendicular to velocity which is $\vec{a}_2$.

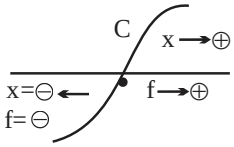
Q.7 (4)



A and C are the position of equilibrium because f = 0 at these positions.

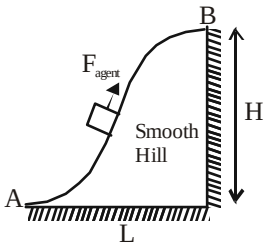


∴ A is the position of stable equilibrium



C is the position of unstable equilibrium.

Q.8 (4)



According to work-energy the work done by all the force equals to change in its kinetic energy.

$W_{ext} + W_{Normal} + W_{mg} = K.E_f - K.E_i$

$W_{ext} + O + W_{mg} = 0 - 0$

$W_{ext} = -W_{mg} = -mgH$

Q.9 (2)

w = area under F-x curve

$$= \frac{1}{2} \times \text{(sum of parallel sides)} \times \text{(seperation between parallel sides)}$$

$$= \frac{1}{2} \times (3+6) \times 3$$

$$= \frac{9 \times 3}{2} = \frac{27}{2} = 13.5J$$

Q.10 (3)

$$\frac{m_1}{m_2} = \frac{2}{3}, \quad \frac{h_1}{h_2} = \frac{9}{16}$$

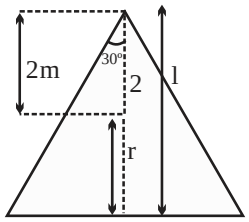
Ratio of velocity just before hitting the ground

$$\frac{v_1}{v_2} = \frac{\sqrt{2gh_1}}{\sqrt{2gh_2}} = \sqrt{\frac{h_1}{h_2}} = \sqrt{\frac{9}{16}} = \frac{3}{4}$$

Ratio of linear momentum

$$\frac{P_1}{P_2} = \frac{m_1 v_1}{m_2 v_2} = \left(\frac{2}{3}\right) \times \left(\frac{3}{4}\right) = \frac{1}{2}$$

Q.11 (2)



$$\ell = 2\cos 30° = \sqrt{3}m$$

$$r = \left(\frac{1}{3}\right)\sqrt{3} = \frac{1}{\sqrt{3}}m$$

$$I = \left[\frac{m\ell^2}{12} + mr^2\right] \times 3$$

$$I = \left[(1)\left(\frac{1}{\sqrt{3}}\right)^2\right]\times 3 + \left[\frac{(1)(2)^2}{12}\right]\times 3$$

$= 2 \text{ kg m}^2$

Q.12 (4)

By applying conservation of energy

$$\frac{1}{2}mv^2 + \frac{1}{2}I\omega^2 = mgh$$

$$\frac{1}{2}mv^2 + \frac{1}{2}\frac{2}{5}MR^2\frac{V^2}{R^2} = mgh ;$$

$$\frac{1}{2}mv^2\left[\frac{7}{5}\right] = mgh \Rightarrow \text{K.E.} = \frac{5mgh}{7}$$

$$\text{Rol. K.E.} = \frac{2}{5}\text{ [K. E.] } = \frac{2}{5}\left(\frac{5mgh}{7}\right) = \frac{2}{7}mgh$$

Q.13 (3)

Time period of geostationary satellite = 24 hour

$T^2 \propto r^3$

$$\frac{T_1^2}{T_2^2} = \frac{r_1^3}{r_2^3} \Rightarrow \left(\frac{T}{T^1}\right)^2 = \left(\frac{r}{2r}\right)^3$$

$$\left(T^1\right)^2 = \left(2^3\right)T^2$$

$$T^1 = \left(2^{3/2}\right)T = \left(2\sqrt{2}\right)\times 24 = 48\sqrt{2}\text{h}$$

Q.14 (4)

$$F_1 = -k_1x, \qquad \omega_1 = \sqrt{\frac{k_1}{m}}$$

$$F_2 = -k_2x, \qquad \omega_2 = \sqrt{\frac{k_2}{m}}$$

$$F_3 = F_1 + F_2 = -(k_1 + k_2)x \text{ ,} \omega = \sqrt{\frac{k_1 + k_2}{m}}$$

$$\omega^2 = \omega_1^2 + \omega_2^2$$

$$T = \sqrt{\frac{T_1^2T_2^2}{T_1^2 + T_2^2}}$$

$$T = \sqrt{\frac{6^2\times 8^2}{6^2 + 8^2}} = \frac{24}{5}\text{s}$$

Q.15 (4)

Here $(2\pi vt/\lambda)$ and $(2\pi x/\lambda)$ are dimensionless. So, unit of v.t. is same as that of λ. Unit of x is same as that of λ.

$$\text{Further } \left[\frac{2\pi vt}{\lambda}\right] = \left[\frac{2\pi x}{\lambda}\right] = M^0L^0T^0$$

$$\therefore \left[\frac{2\pi v}{\lambda}\right] = \left[\frac{2\pi x}{\lambda t}\right]$$

In option (4), x/λ is unitless while v/λ is not unitless.

Hence (4) is wrong.

OR

$$y = 2A\sin\left(\frac{2\pi vt}{\lambda}\right)\cos\left(\frac{2\pi x}{\lambda}\right)$$

$$\frac{2\pi Vt}{\lambda} = \text{dimensionlens} \quad \frac{2\pi x}{\lambda} = \text{dimensionlens}$$

Unit of $\frac{2\pi V}{\lambda}$ is sec^{-1} of Hz

Unit of $\frac{2\pi x}{\lambda t}$ is sec^{-1} of Hg

Unit of [Vt] = Com of m

Unit of [λ] = m

Unit of $\frac{V}{\lambda}$ is $\text{sec}^{-1} \neq$ Unit of $\frac{x}{\lambda}$ (Unitless)

Q.16 (3)

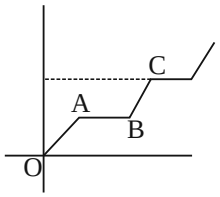
$V = 2n(\ell_2 - \ell_1)$

$= 2 \times 512 (0.55 - 0.18)$

$= 1024 (0.37)$

≈ 379 m/s

Q.17 (3)



OA : Substance is in solid state and its temperature is increasing

AB : Substance is changing its phase from solid to the liquid and at point B it is in liquid state.

BC : Substance is in liquid state and its temperature increases.

Q.18 (1)

Heat taken by ice to melt at 0°C is $Q_2 = mL = 540 \times 80 = 43200$ cal

Heat given by water to cool upto 0°C is $Q_2 = ms\Delta\theta = 540 \times 1\times$ *80–0) = 43200 cal

Hence heat given by water is just sufficient to melt the whole ice and final temperature of mixture is 0°C.

Q.19 (3)

For adiabatic process,

$Q = 0$

$\Delta U + w = 0$

$\Delta U = -w$

$\therefore$ Statement- I is correct

for adiabatic process $Q = nC\Delta T = 0$

$c = 0$

$\therefore$ Statement- II is incorrect.

Q.20 (1)

In cyclic process $\Delta U = 0$

$\therefore$ Q = W

For 20 cycle

Q = 20 W

$= 20 \times \frac{1}{2} \times (20-5) \times (30-10)$

= 10 × 15 × 20 = 3 kJ

Q.21 (1)

$\alpha_1 L_1 = \alpha_2 L_2$

αL = const

$$\frac{L_S}{L_C} = \frac{\alpha_C}{\alpha_S} = \frac{1.7\times10^{-5}}{1.1\times10^{-5}} = \frac{17}{11}$$

Q.22 (3)

Pressure difference = $\rho(g + a)h$

$= \rho(g + g/3)h$

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

Q.23 (2)

Q.24 (3)

Let h be the height through which the liquid riese in the caplillary tube of radius r.

$$h = \frac{2T\cos\theta}{rdg}$$

Mass of the water in the first tube is

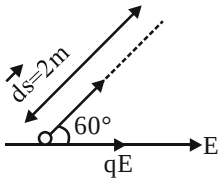
$$m = \pi r^2 hd = \pi r^2 \times \left(\frac{2T\cos\theta}{rdg}\right) \times d = \frac{\pi r 2T\cos\theta}{g}$$

$m \propto r$

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

$\Rightarrow$ m = 2m = 2 × 5g = 10g

Q.25 (1)



$w = \vec{F}.\vec{S}$ -

$w = FS\cos 60° = (qES) \times \frac{1}{2}$

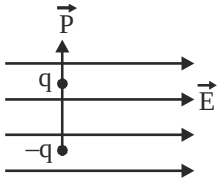
$4 \times 10^{-3} = 2 \times 10^{-6} \times E \times 2 \times \frac{1}{2}$

$E = 2 \times 10^3$ N/C

Q.26 (2)

Net force on the dipole in a uniform electric field is zero. it is independent of position of dipole in electronc field.

Assertion is false.



$\vec{\tau} = \vec{P} \times \vec{E}$

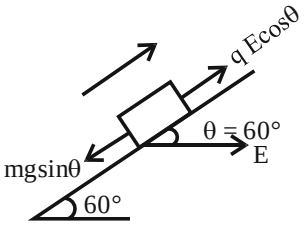
$|\vec{\tau}| = PE\sin 90°$

= PE = maximum torque

$\therefore$ Reason is also false

Ans. (2)

Q.27 **(3)**



For block to remain at rest

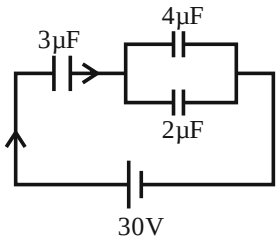
$qE\cos\theta = mg\sin\theta$

$$E = \frac{mg}{q}\frac{\sin 60°}{\cos 60°}$$

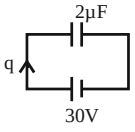
$$= \frac{5\times10^{-3}\times10}{5\times10^{-6}} \times \sqrt{3}$$

$= \sqrt{3} \times 10^4$ N / C

Q.28 (2)



$$C_{eq} = \frac{(3)(6)}{3+6} = \frac{18}{9} = 2\mu F$$



Charge flow , q = CV = 2 × 30 = 60μC

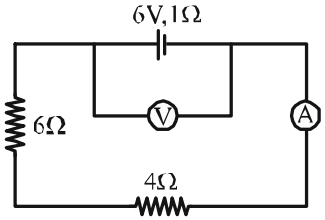
Charge on 3μF , Q = 60μC (iv) $\rightarrow$ C

Charge give by battery , Q = 60μC (i) $\rightarrow$ C

Charge on 2μF = $\frac{2}{2+4} \times 60 = 20\mu C$ (iii) $\rightarrow$ a

Charge on 4μF = $\frac{4}{2+4} \times 60 = 40\mu C$ (ii) $\rightarrow$ d

Q.29 (2)



$R_{eq} = 6 + 4 + 1 = 11\ \Omega$

$i = \frac{\varepsilon}{R_{eq}} = \frac{6}{11}A$

$\therefore$ Reading of ammeter = $i = \frac{6}{11}A$

Reading of voltmeter = $6 - ir$

$$= 6 - \frac{6}{11}(1) = \frac{60}{11}V$$

Q.30 (2)

In both the cases applied voltage is same. So, heat developed is

$H = \frac{V^2}{R}t$

$H \propto \frac{1}{R}$

$\frac{H_1}{H_2} = \frac{R_2}{R_1} \Rightarrow H_2 = \frac{R_1}{R_2}H_1$

for heat developed in the wire to become double that of initial

$\frac{R_1}{R_2} = 2$

$R_1 = 2R_2$

$\frac{\rho\ell_1}{A_1} = 2\frac{\rho\ell_2}{A_2}$ $\qquad (A = \pi r^2)$

$\frac{\ell_1}{\ell_2} = 2\frac{r_1^2}{r_2^2}$

When length and radius both becomes double then

$\frac{\ell_1}{2\ell_1} = 2\frac{r_1^2}{(2r_1)^2}$

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

Hence, in that case heat developed will become double that of the initial,

Q.31 (1)

Magnetic field due long current carrying wire at distance. r,

$$B = \frac{\mu_0 i}{2\pi r} = 1T$$

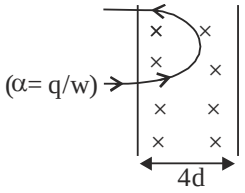
(a) at distance $\frac{r}{2}$, $\quad B' = \frac{\mu_0 i}{2\pi\left(\frac{r}{2}\right)} = 2T$

(b) at distance 2r, $\quad B'' = \frac{\mu_0 i}{2\pi(2r)} = \frac{1}{2}T$

(c) at distance 3r, $\quad B''' = \frac{\mu_0 i}{2\pi(3r)} = \frac{1}{3}T$

Ans. (1)

Q.32 (2)



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

$v = \alpha Br$ $\qquad$ (Given, $v = 2\alpha dB$)

$2\alpha dB = \alpha Br$

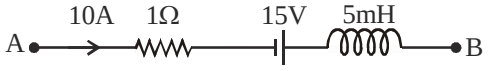
$r = 2d$

Time spent by particle in magnetic field

$t = \frac{1}{2}\left(\frac{2\pi m}{qB}\right)\left(\alpha = \frac{q}{m}\right)$

$t = \frac{\pi}{\alpha B}$

Q.33 **(2)**

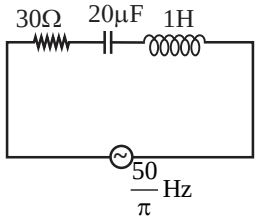


$V_A - (10)(1) + 15 + L\frac{di}{dt} = V_B$

$V_A - V_B + 5 = -L\frac{di}{dt}$

$-\frac{di}{dt} = \frac{(V_A - V_B) + 5}{L} = \frac{20 + 5}{5 \times 10^{-3}} = 5 \times 10^3\ A/sec$

Q.34 (2)



$R = 300\Omega$

$$X_C = \frac{1}{\omega c} = \frac{1}{2\pi f c} = \frac{1}{2\pi\left(\frac{50}{\pi}\right)20\times10^{-6}}$$

$$= \frac{10^6}{2\times100} = 500\Omega$$

$$X_L = \omega L = 2\pi\times\frac{50}{\pi}\times1 = 100\Omega$$

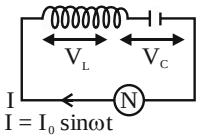
$$Z = \sqrt{R^2 + (X_C - X_L)^2}$$

$$= \sqrt{(300)^2 + (500-100)^2}$$

= 500 Ω

$$i = \frac{V_{rms}}{Z} = \frac{50}{500} = 0.1A$$

Q.35 (4)

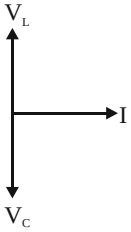


$I = I_0 \sin\omega t$

$I = I_0 \sin\omega t$

$$V_L = I_0 X_L \sin\left(\omega t + \frac{\pi}{2}\right)$$

$$V_C = I_0 X_C \sin\left(\omega t - \frac{\pi}{2}\right)$$

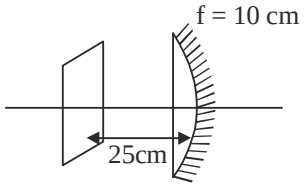


Q.36 (1)

f_0 = 140 cm , f_e = 5 cm

Magnification (m) = $\frac{f_0}{f_e} = \frac{140}{5} = 28$

Q.37 (1)



Magnification,

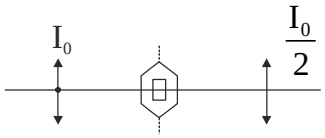
$$m = \frac{f}{f-u}$$

$$m = \frac{-10}{-10-(-25)} = \frac{-10}{15} = -\frac{2}{3}$$

Area of image = $m^2 A_o$

$$= \left(\frac{2}{3}\right)^2 \times (3\text{cm})^2 = 4\text{cm}^2$$

Q.38 (1)



Intensity of light which does not transmitted = $\frac{I_0}{2}$

Q.39 (2)

Vs = 4.8 V

$K.E._{max} = E - \phi$

$$eV_S = \frac{hc}{\lambda} - \phi$$

$$4.8eV = \frac{hc}{\lambda} - \phi \qquad \text{... (1)}$$

$$1.6eV = \frac{hc}{2\lambda} - \phi \qquad \text{... (2)}$$

Dividing equation (1) and (2)

$$3 = \frac{\frac{hc}{\lambda} - \phi}{\frac{hc}{2\lambda} - \phi}$$

$$\frac{3hc}{2\lambda} - 3\phi = \frac{hc}{\lambda} - \phi$$

$$\frac{hc}{2\lambda} = 2\phi \quad \Rightarrow \quad \phi = \frac{hc}{4\lambda}$$

$$\frac{hc}{\lambda_{th}} = \frac{hc}{4\lambda}$$

$\therefore \lambda_{th} = 4\lambda$

Q.40 (2)

Ionization energy = $13.6\times\frac{Z^2}{n^2}$

for He, z = 2 ; n = 3

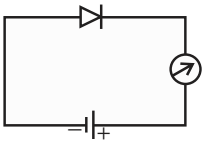
$$\text{I.E.} = 13.6\times\frac{(2)^2}{(3)^2} = 6.04\text{eV}$$

Q.41 (2)

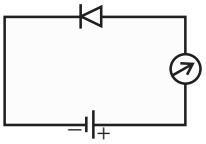
In fission heary nucleus breaks in to two smaller nuclear, not in case of fusion

Option (2) is incorrect

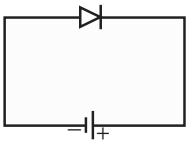
Q.42 (2)



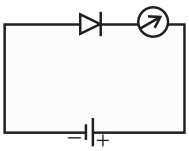
diode is in reverse biased condition. So, no current flow
$\therefore$ reading will be zero.



diode is in forward biased condition So, the reading of ammeter will be non zero.



Reverse biase
$\therefore$ i = 0



Reverse biase
$\therefore$ i = 0

Q.43 (4)

$$\vec{B} = \frac{2k\vec{M}}{r^3}$$

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

Q.44 (2)

Speed of light in vacuum = $c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$

Speed of light in a medium of dielectric constant K and relative permeability, μ_r is

$$V = \frac{1}{\sqrt{\mu_0 \mu_r k \varepsilon_0}}$$

$$v = \frac{1}{\sqrt{\mu_r k}}\left(\frac{1}{\sqrt{\mu_0 \varepsilon_0}}\right)$$

$$v = \frac{c}{\sqrt{\mu_r k}}$$

Q.45 (2)

$$Q = \frac{x^n}{y^m}$$

$$\frac{\Delta Q}{Q} = n\frac{\Delta X}{X} + m\frac{\Delta Y}{Y}$$

$$\Delta Q = \pm\left(n\frac{\Delta X}{X} + m\frac{\Delta Y}{Y}\right)Q$$

Q.46 (3)

$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
$6\ell \quad ?$

for 1L $C_3H_8 \rightarrow 5$ L O_2 required

$\therefore$ for 6ℓ $C_3H_8 \rightarrow \frac{5}{1} \times 6 = 30\ell.O_2$req.

and in Air only 20% oxygen is present so

Vol. of Air $\times \frac{20}{100} = 30\ell$

Vol. of Air = $30 \times \frac{100}{20} = 150$ litre.

Q.47 **(3)**

Q.48 **(4)**

Cathod rays dees not depend on gas present in cathode ray tube & cathode rays used in T.V. picture tubes

Q.49 (3)

L $\longrightarrow$ R (in a period) $\longrightarrow$ E.N $\uparrow$

T $\downarrow$

B (in a group) $\longrightarrow$ E.N $\downarrow$

Q.50 **(4)**

$Al_2O_3 \xrightarrow{HOH} Al(OH)_3$

because it reacts with both acid as well as base.

Q.51 **(4)**

size $Cl^{\ominus} > K^{\oplus}\{18e^{\ominus}\}$

$$\text{size} \propto \frac{\text{Negative charge}}{\text{positive charge}}$$

{for iso electronic species}

Q.52 (1)

$NO \rightarrow$ B.O = 2.5 $\rightarrow$ Paramagentic

$NO^{\oplus} \rightarrow$ B.O = 3 $\rightarrow$ diamagnetic

Q.53 (2)

O = C = O $\rightarrow$ 8 valence $e^{\ominus}$

AlCl3 $\rightarrow 6e^{\ominus} \rightarrow$ Hypovalent

PCl_5 and $SO_2 \rightarrow$ Hypervalent

Q.54 (3)

'Xe' shows 'zero' valency in ground state.
'2' valency in first excited state.

'4' valency in second excited state.

Q.55 (1)

$H_2O_{(\ell)} \xrightarrow[373\ K]{1bar} H_2O_{(g)}$

condition of equilbrium so $\Delta G = 0$ & liquid is converted into gas so entropy increases

$\therefore\ \Delta S > 0$

Q.56 **(2)**

$$\underset{\text{Mole}}{} \begin{matrix} 2CO_{(g)} & + & O_{2(g)} & \rightarrow & 2CO_{2(g)} \\ 2 & & 1 & & - \end{matrix}$$

$\Delta H = \Delta U + \Delta n_g RT$ ($\Delta ng = 2–3 = –1$

$\Delta H = \Delta U – RT$

$\Delta U > \Delta H$

Q.57 **(2)**

$X_{(s)} \rightleftharpoons A_{(g)} + 2B_{(g)}$ $\quad k_p = 108 \times 10^{-3}\ atm^3$

1-p $\quad$ p $\quad$ 2p

$k_p = p \times (2p)^2$

$108 \times 10^{-3} = 4p^3$

$$p = \left(\frac{108}{4} \times 10^{-3}\right)^{1/3}$$

$$p = \left(27 \times 10^{-3}\right)^{1/3}$$

$p = 3 \times 10^{-1} = 0.3$

Total pressure = $3p = 3 \times 0.3 = 0.9$

Q.58 **(3)**

$KX \rightarrow$ SBWA Salt

$$h = \sqrt{\frac{Kw}{K_a.C}}$$

$$h = \sqrt{\frac{10^{-14}}{10^{-7} \times 10^{-1}}}$$

$h = 10^{-3}$

$\%h = 10^{-3} \times 10^2 = 10^{-1}$

$\%h = 0.1\%$

Q.59 (2)

Mili eq. of NaOH = $800 \times 0.05 = 40$

Mili eq. of HCl = $200 \times 0.1 = 20$

Eq. of Base > Eq. of Acid

So Solution is basic

$$[OH^-] = \frac{\text{Mili.equivalent of Base} - \text{Mili.equivalent of Acid}}{\text{total vol.}}$$

$$= \frac{40 - 20}{1000} = \frac{20}{1000}$$

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

$p^{OH} = -\log[OH^-] = -\log(2 \times 10^{-2})$

$p^{OH} = 2 - \log 2 = 1.7$

$p^H = 14 - 1.7 = 12.3$

Q.60 (1)

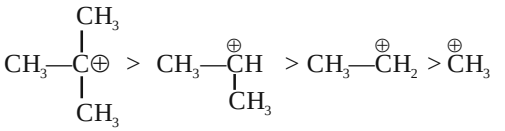
$$Zn + H_2SO_4 \rightarrow \overset{+2}{Z}nSO_4 + H_2$$

$\left(Zn \rightarrow \overset{+2}{Z}n\right)$

oxidation number ↑ so oxidation take place.

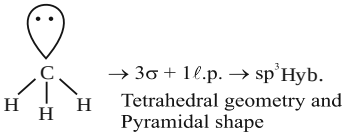
Q.61 **(4)**

Stability of $C^{\oplus} \propto$ No. of α-H



9 α-H $\quad$ 6 α-H $\quad$ 3 α-H $\quad$ 0 α-H

Q.62 (3)



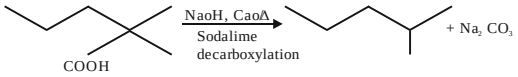
Q.63 (4)

$$-\overset{|}{\underset{|}{C}}- \rightarrow sp^3 \quad = \underset{|}{C} - \rightarrow sp^2 \quad = C - \rightarrow Sp$$

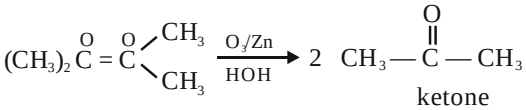
$CH_3 - CH = CH - CH_3$

$Sp^3 \quad Sp^2 \quad Sp^2 \quad Sp^3$

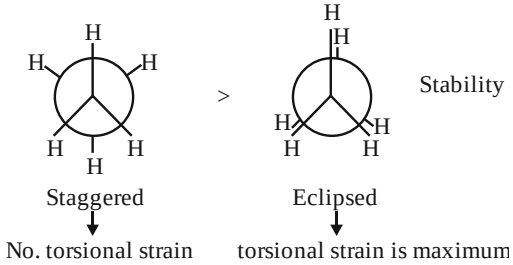
Q.64 (1)



Q.65 (4)



Q.66 **(4)**



Torsional strain → repulsion b/w bonded pair of electrons, depends on distance b/w bonds.

Q.67 (1)

$K_H \propto$ temp

$K_H \propto$ 1/solubility of gas

K_H value is different for different gases. So it is the characteristics constant of gas solvent system

so I & III is True

Q.68 (2)

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

$$= 266 \times \frac{2}{5} + 236 \times \frac{3}{5}$$

= 106.4 × 141.6
= 248 mm of long

Q.69 (1)

$\Delta G^o = -2.303\ RT \log keq^m$

$\Delta G^o = -nFE^o_{cell}$

If $E^o_{cell} > 0 \Rightarrow \Delta G^o < 0$

& if $\Delta G^o < 0$ then $keq^m > 1$

Q.70 **(2)**

$$\lambda_m = \frac{\kappa \times 1000}{M}$$

$$= \frac{1.6\times10^{-3}\times1000}{10^{-2}} = 160\ S\ cm^2\ mol^{-1}$$

Q.71 **(4)**

$2SO_2 + O_2 \rightarrow 2SO_3$

$$\frac{d[SO_3]}{dt} = 0.4\times10^{-3}\ kg/min$$

$$-\frac{d[SO_2]}{dt} = ?$$

$$ROR = \frac{1}{2}\left(\frac{-d[SO_2]}{dt}\right) = -\frac{d[O_2]}{dt} = \frac{1}{2}\left(\frac{d[SO_3]}{dt}\right)$$

$$-\frac{d[SO_2]}{dt} = \frac{d[SO_3]}{dt}$$

$$\frac{d[SO_3]}{dt} = \frac{0.4\times10^{-3}\times10^3}{80}$$

$$\frac{-d[SO_2]}{dt} = \frac{0.4\times10^{-3}\times10^3}{80}\times64\times10^{-3}$$

$= 3.2 \times 10^{-4}$ kg/mini

Q.72 **(2)**

$$t_{1/2} = 2772\ sec = \frac{0.693}{k}$$

$r = k[A]^1$

$r = k$

$$r = \frac{0.693}{2772} = 0.25\times10^{-3}$$

$r = 2.5 \times 10^{-4}\ s^{-1}$

Q.73 (4)

Reducing property of dioxide decrease from SO_2 to TeO_2.

Q.74 (4)

PbI_4 does not exist because due to inert pair effect Pb^{2+} is more stable

Q.75 **(3)**

$$K_2Cr_2O_7 \xrightarrow{2KOH} K_2CrO_4 + H_2O$$

$$\underset{[\text{yellow colour}]}{K_2CrO_4} \rightarrow 2K^+CrO_4^{-2}$$

Q.76 **(2)**

Zr and Hf has similary atomic Radii due to lanthanoid construction.

Q.77 **(4)**

$[CoF_6]^{3-} \rightarrow Co^{+3} \rightarrow 3d^6$

$F^- \rightarrow$ is W.F.L.

$t_{2g}^3 e_g^2$ so hyb. sp^3d^2.

So it is called High Spin complex or spin free complex.

Q.78 **(1)**

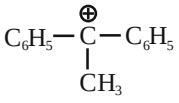
In $[Sc(NH_3)_6]^{+3}$, Sc^{+3} ion is present which is colourless.

Q.79 **(1)**

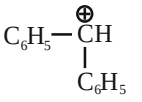
$EDTA^{4-}$ is used in the treatment of lead poisonig

Q.80 **(1)**

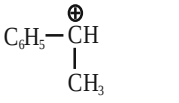
Reactivity towards $S_{N^1} \propto$ stability of $C^{\oplus}$



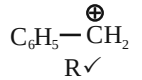
$2R\checkmark + 3\alpha\text{-H}$



$2R\checkmark$



$R\checkmark + 3\alpha\text{-H}$

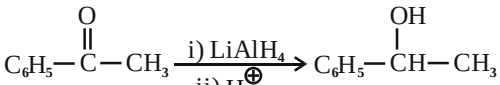


$R\checkmark$

Q.81 **(4)**

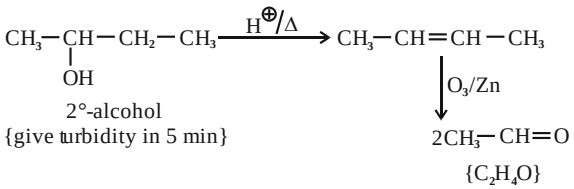
$CrO_3 +$  $+ HCl \rightarrow$ PCC is an mild oxidising agent which oxidise 1°-Alcohol into aldehyde.

Q.82 (2)



2°-Alcohol

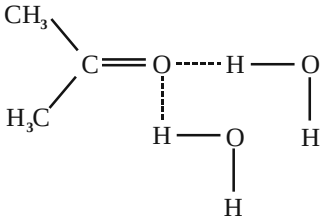
Q.83 (1)



2°-alcohol
{give turbidity in 5 min}

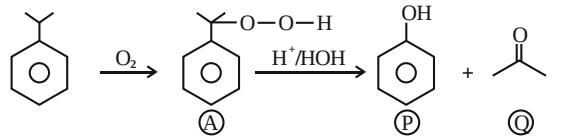
{C_2H_4O}

Q.84 (4)



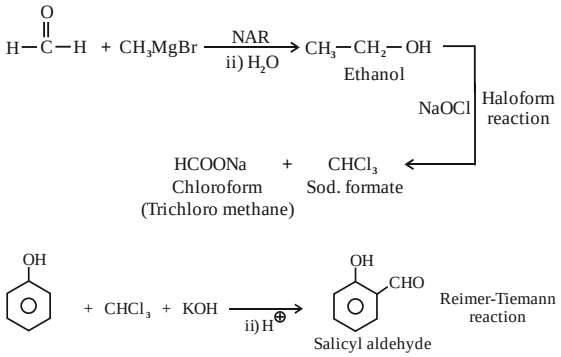
Acetone form H-bond with H_2O molecules.
That's why it is soluble in water.

Q.85 (1)

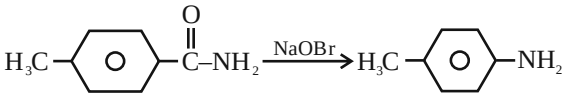


Cumene | Cumene hydro-peroxide | Phenol | acetone

Q.86 (4)



Q.87 (3)



Q.88 **(2)**

In case of substituted aniline $-OCH_3$ group incerases basic strength from ortho and para position not from meta.

$$Kb \rightarrow NH_3 \quad < \quad \overset{+I}{CH_3} - NH_2$$

$$P^{Kb} \rightarrow \qquad >$$

Q.89 (2)

α-and β-form & glucose differ in configuration only at anomeric carbon so they are anomers of each other.

Q.90 (2)

$Na_2[Fe(CN)_5NO] + Na_2S \rightarrow Na_4[Fe(CN)_5NOS]$

Sod. nitro prusside (violet colour) | Sod. thio nitro prusside

Q.91 (2)
Q.92 (4)
Q.93 (3)
Q.94 **(1)**

New NCERT Pg. No. 24

Both Assertion and Reason are true and Reason is the correct explanation of Assertion

Assertion: Sexual reproduction in *Spirogyra* is isogamous, which is true.

Reason: Both fusing gametes of *Spirogyra* are non-flagellated and similar in size, which is true and explains the assertion

Q.95 (2)
Q.96 (1)
Q.97 (2)
Q.98 (3)
Q.99 (1)
Q.100 (3)
Q.101 (4)
Q.102 (4)
Q.103 (1)
Q.104 (2)
Q.105 (4)
Q.106 (2)
Q.107 (2)
Q.108 (3)
Q.109 (1)
Q.110 (2)

New NCERT Pg. No. 140 -141

- Grana lamellae contain both photosystem I (PS-I) and photosystem II (PS-II), which are essential for the light-dependent reactions of photosynthesis.
- When protons accumulate inside the thylakoid lumen, the pH decreases, indicating an increase in acidity. This happens when the H+ gradient is established across the thylakoid membrane.
- Statements (i) and (ii) are correct, while statements (iii) and (iv) are either partially correct or unrelated to the direct mechanisms of proton movement in photosynthesis.

Q.111 (4)
Q.112 (3)
Q.113 (3)
Q.114 (4)

New NCERT Pg. No. 176

Sugarcane stores carbohydrate as sugar in their stems. Spraying sugarcane crop with gibberellins increases the length of the stem, thus increasing the yield by as much as 20 tonnes per acre.

Q.115 (2)
Q.116 (1)
Q.117 (4)

NEW NCERT Pg. No -13

Wind pollinated flowers often have a single ovule in each ovary and numerous flowers packed into an inflorescence. They often posses well exposed stamens and large often feathery stigma to easily trap air borne pollen grains.

Q.118 (3)
Q.119 (3)

NEW NCERT Pg. No -7

In the remaining species, the generative cell divides mitotically to give rise to the two male gametes before pollen grains are shed (3-celled stages).

Q.120 (2)
Q.121 (2)
Q.122 (3)
Q.123 (1)
Q.124 (1)
Q.125 (3)

NEW NCERT Pg. No - 153

Pectinase - Used to clarify fruit juices
lipase - used in detergent formulations.
Streptokinase - Used to treat myocardial infarction

Q.126 (4)
Q.127 (3)
NEW NCERT Pg. No. - 177

Three critical research areas of biotechnology are:
(i) Providing the best catalyst in the form of improved organism usually a microbe or pure enzyme.
(ii) Creating optimal conditions through engineering for a catalyst to act, and
(iii) Downstream processing technologies to purify the protein/organic compound)

Q.128 (2)
NEW NCERT Pg. No. - 180

the process of **RNA interference** (RNAi). RNAi takes place in all eukaryotic organisms as a method of cellular defense. This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing).

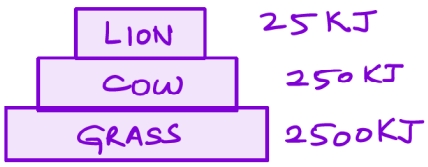
Q.129 (1)
NEW NCERT Pg. No. - 180

Bacillus thuringiensis → Insecticideal protein
Meloidegyne incognitia → RNA interference
Agrobacterium tumifaciens → Cloning vector
ELISA → Molecular diagnosis

Q.130 (4)
Q.131 (4)
Q.132 (2)
NEW NCERT Pg. No. - 208

Net primary productivity is the available biomass for the consumption to heterotrophs (herbivores and decomposers). Secondary productivity is defined as the rate of formation of new organic matter by consumers. Primary productivity depends on the plant species inhabiting a particular area. It also depends on a variety of environmental factors, availability of nutrients and photosynthetic capacity of plants.

Q.133 (2)
NEW NCERT Pg. No. - 211



The number of trophic levels in the grazingfood chainis restricted as the transfer of energy follows 10 per cent law - only 10 per cent of the energy is transferred to each trophic levelfrom the lower trophic level.

Q.134 (1)
Q.135 (1)
NEW NCERT Pg. No -185

There are an estimated 200,000 varieties of rice in India alone. The diversity of rice in India is one of the richest in the world. Basmati rice is distinct for its unique aroma and flavour and 27 documented varieties of Basmati are grown in India.

Q.136 (2)
NEW NCERT Pg. No - 223

Many species extinctions in the last 500 years (Steller's sea cow, passenger pigeon) were due to overexploitation by humans.
The Nile perch introduced into Lake Victoria in east Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake.
The recent illegal introduction of the African catfish Clarias gariepinus for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers.
When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

Q.137 (2)
NEW NCERT Pg. No. - 40 , 41, 45

a matches with iv , b with iii , c with ii and d with i

Q.138 (4)
NEW NCERT Pg. No. - 44

Arthropods having open circulatory system with dorsal heart
They are characterized by jointed appendages , chitinous exoskeleton and somewhere segmentation also but they do not have ventral tubular heart

Q.139 (3)
NEW NCERT Pg. No. - 45

Here X is trunk and Y is proboscis
Both represents the body parts of member BALANAGLOSSUS of phylum hemichordata Body is worm like

Q.140 (1)
Q.141 (1)
Q.142 (4)
Q.143 (4)
Q.144 (4)
Q.145 (4)
Q.146 (1)
Q.147 (1)
Q.148 (3)
Q.149 (2)

Centrosome duplication occurs during S phase of interphase.

Q.150 (1)
NEW NCERT Pg. No. - 183

Lower invertebrates like sponges, coelenterates, flatworms, etc., exchange O_2 with CO_2 by simple diffusion over their entire body surface. Earthworms use their moist cuticle and insects have a network of tubes (tracheal tubes) to transport atmospheric air within the body. Special vascularised structures called gills (branchial respiration) are used by most of the aquatic arthropods and molluscs whereas vascularised bags called lungs (pulmonary respiration) are used by the terrestrial forms for the exchange of gases. Among

vertebrates, fishes use gills whereas amphibians, reptiles, birds and mammals respire through lungs. Amphibians like frogs can respire through their moist skin (cutaneous respiration) also.

Q.151 (4)

NEW NCERT Pg. No. - 187

Expiratory Capacity (EC): Total volume of air a person can expire after a normal inspiration. This includes tidal volume and expiratory reserve volume (TV+ERV).

Q.152 (3)

Q.153 (4)

Q.154 (2)

NEW NCERT Pg. No. - 206

In humans, the excretory system consists of a pair of kidneys, one pair of ureters, a urinary bladder and a urethra

Q.155 (1)

NEW NCERT Pg. No. - 209

PCT is lined by simple cuboidal brush border epithelium which increases the surface area for reabsorption. Nearly all of the essential nutrients, and 70-80 per cent of electrolytes and water are reabsorbed by this segment.

Q.156 (3)

Q.157 (1)

Q.158 (2)

NEW NCERT Pg. No. - 234

There are two types of synapses, namely, electrical synapses and chemical synapses

Chemicals called neurotransmitters are involved in the transmission of impulses at these synapses.The axon terminals contain vesicles filled with these neurotransmitters.Electrical synapses are rare in our system.

Q.159 (1)

NEW NCERT Pg. No. - 236

The forebrain consists of cerebrum, thalamus and hypothalamus Cerebrum forms the major part of the human brain. A deep cleft divides the cerebrum longitudinally into two halves, which are termed as the left and right cerebral hemispheres. The hemispheres are connected by a tract of nerve fibres called corpus callosum.

Q.160 (1)

NEW NCERT PAGE NO - 245, 246

Insulin is a peptide hormone, which plays a major role in the regulation of glucose homeostasis. Insulin acts mainly on hepatocytes and adipocytes (cells of adipose tissue), and enhances cellular glucose uptake and utilisation.

Q.161 (3)

NEW NCERT Pg. No - 27

The male sex accessory ducts indude rete testis, vasa efferentia, epididymis and vas deferens.

Q.162 (1)

Q163 (2)

Q.164 (4)

NEW NCERT Pg. No - 31

Spernatogenesis starts at the age of puberty due to significant increase in the secretion of gonadotrophin releasing hormone (GnRH). It is a hypothalmic hormone.

Q.165 (4)

NEW NCERT Pg. No. -44

Diaphragms, cervical caps and vaults are also barriers made of rubber that are inserted into the female reproductive tract to cover the cervix during coitus. They prevent conception by blocking the entry of sperms through the cervix.

Intra Uterine Devices are presently available as the non-medicated IUDs (e.g., Lippes loop), copper releasing IUDs (CuT, Cu7, Multiload 375) and the hormone releasing IUDs (Progestasert, LNG-20)

Q.166 (2)

Q.167 (3)

Q.168 (1)

Q.169 (1)

NEW NCERT Pg. No. -104

The sequencing of chromosome 1, the largest human chromosome, was completed in 2006, not 2003. Other statements about the Human Genome Project (HGP) being a mega project, usage of bacterial hosts, and sequencing of 22 autosomes are correct.

Q.170 (4)

NEW NCERT Pg. No. -95

RNA Polymerase III is responsible for synthesizing smaller RNA molecules like tRNA, 5S rRNA, and scRNA.

hnRNA (heterogeneous nuclear RNA), however, is synthesized by RNA Polymerase II, making option (4) incorrect. This RNA is the precursor to mRNA and undergoes processing before translation.

Q.171 (4)

NEW NCERT Pg. No. -91 , 93

During transcription one segment of the DNA would be coding for two different proteins, and this would complicate the genetic information transfer machinery. Second, the two RNA molecules if produced simultaneously would be complementary to each other, hence would form a double stranded RNA.

Cistron as a segment of DNA coding for a polypeptide, the structural gene in a transcription unit could be said as monocistronic (mostly in eukaryotes)

Q.172 (2)

NEW NCERT Pg. No - 122

In 1938, a fish caught in South Africa happened to be Coelacanth which was though to be extinct. These animals called lobefins evolved into the first amphibians that lived on both land and water. There are no specimens of these left with us. However, these were ancestors of modern day frogs and salamanders.

Q.173 (4)

NEW NCERT Pg. No -121

About 2000 million years ago (mya) the first cellular forms of life appeared on earth. By the time of 500 mya, invertebrates were formed and active, Jawless fish probably evolved around 350 mya. About 65 mya, the dinosaurs suddenly disappeared from the earth.

Due to continental drift, when South America joined North America, these animals were overridden by North AMerican fauna. Due to the same continental drift pouched mammals of AUstralia survived because of lack of competition from any other mammal.

Q.174 (1)

NEW NCERT Pg. No -136

The yellowish fluid *colostrum* secreted by mother during the initial days of lactation has abundant antibodies (IgA) to protect the infant. The foetus also receives some antibodies from their mother, through the placenta during pregnancy. These are some examples of passive immunity.

Q.175 (2)

Q.176 (2)

NEW NCERT Pg. No -142

Treatment of cancer : The common approaches for treatment of cancer are surgery, radiation therapy and immunotherapy.

Most cancers are treated by combination of surgery, radiotherapy and chemotherapy.

Q.177 (3)

NEW NCERT Pg. No -143

Cannabinoids are a group of chemicals which interact with cannabinoid receptors present principally in the brain. Natural cannabinoids are obtained from the inflorescences of the plant Cannabis saliva.

The flower tops, leaves and the resin of cannabis plant are used in various combinations to produce marijuana, hashish, charas and ganja. Generally taken by inhalation and oral ingestion, these are known for their effects on cardiovascular system of the body.

Q.178 (2)

Q.179 (2)

Q.180 (1)