ANSWER KEY FULL TEST-12

				PH	YSICS				
Q.1 (1)	Q.2 (3)	Q.3 (2)	Q.4 (1)	Q.5 (1)	Q.6 (1)	Q.7 (3)	Q.8 (2)	Q.9 (2)	Q.10 (3)
Q.11 (2)	Q.12 (2)	Q.13 (1)	Q.14 (2)	Q.15 (3)	Q.16 (2)	Q.17 (4)	Q.18 (4)	Q.19 (4)	Q.20 (2)
Q.21 (1)	Q.22 (1)	Q.23 (1)	Q.24 (1)	Q.25 (3)	Q.26 (1)	Q.27 (4)	Q.28 (2)	Q.29 (4)	Q.30 (3)
Q.31 (1)	Q.32 (1)	Q.33 (3)	Q.34 (2)	Q.35 (3)	Q.36 (2)	Q.37 (2)	Q.38 (1)	Q.39 (3)	Q.40 (2)
Q.41 (4)	Q.42 (1)	Q.43 (1)	Q.44 (1)	Q.45 (1)					
CHEMISTRY									
Q.46 (1)	Q.47 (1)	Q.48 (3)	Q.49 (3)	Q.50 (3)	Q.51 (3)	Q.52 (1)	Q.53 (3)	Q.54 (2)	Q.55 (4)
Q.56 (4)	Q.57 (2)	Q.58 (3)	Q.59 (1)	Q.60 (4)	Q.61 (4)	Q.62 (4)	Q.63 (1)	Q.64 (1)	Q.65 (4)
Q.66 (4)	Q.67 (4)	Q.68 (3)	Q.69 (2)	Q.70 (1)	Q.71 (3)	Q.72 (3)	Q.73 (3)	Q.74 (4)	Q.75 (4)
Q.76 (2)	Q.77 (4)	Q.78 (1)	Q.79 (2)	Q.80 (2)	Q.81 (2)	Q.82 (2)	Q.83 (1)	Q.84 (4)	Q.85 (1)
Q.86 (4)	Q.87 (2)	Q.88 (1)	Q.89 (3)	Q.90 (3)					
				вю	LOGY				
Q.91 (3)	Q.92 (3)	Q.93 (3)	Q.94 (3)	Q.95 (4)	Q.96 (1)	Q.97 (3)	Q.98 (2)	Q.99 (4)	Q.100(2)
Q.101 (2)	Q.102 (1)	Q.103 (4)	Q.104 (3)	Q.105 (3)	Q.106 (3)	Q.107 (2)	Q.108 (3)	Q.109 (2)	Q.110 (3)
Q.111 (4)	Q.112 (1)	Q.113 (4)	Q.114 (2)	Q.115 (4)	Q.116 (1)	Q.117 (4)	Q.118 (1)	Q.119 (4)	Q.120 (3)
Q.121 (1)	Q.122 (1)	Q.123 (2)	Q.124 (4)	Q.125 (2)	Q.126 (2)	Q.127 (2)	Q.128 (2)	Q.129 (4)	Q.130 (3)
Q.131 (1)	Q.132 (2)	Q.133 (1)	Q.134 (4)	Q.135 (2)	Q.136 (2)	Q.137 (3)	Q.138 (4)	Q.139 (2)	Q.140 (1)
Q.141 (2)	Q.142 (2)	Q.143 (3)	Q.144 (3)	Q.145 (2)	Q.146 (1)	Q.147 (4)	Q.148 (2)	Q.149 (4)	Q.150 (3)
Q.151 (3)	Q.152 (3)	Q.153 (3)	Q.154 (3)	Q.155 (4)	Q.156 (4)	Q.157 (4)	Q.158 (4)	Q.159 (1)	Q.160 (4)
Q.161 (3)	Q.162 (1)	Q.163 (2)	Q.164 (3)	Q.165 (1)	Q.166 (2)	Q.167 (2)	Q.168 (1)	Q.169 (3)	Q.170 (3)
Q.171 (3)	Q.172 (1)	Q.173 (4)	Q.174 (3)	Q.175 (4)	Q.176 (2)	Q.177 (4)	Q.178 (1)	Q.179 (1)	Q.180 (4)
1									

HINTS & SOLUTION

$$v = at^2 \cos \theta + \frac{b}{t \cos \theta}$$

$$[v] = \left[\frac{b}{t\cos\theta}\right] \Rightarrow [b] = \left[L^{1}T^{-1}\right]\left[T^{1}\right] = \left[L^{1}\right]$$

$$a = \frac{\left \lfloor v \right \rfloor}{\left \lfloor t^2 \right \rfloor} = \frac{\left \lfloor L^l T^{-1} \right \rfloor}{\left \lfloor T^2 \right \rfloor} = \left \lfloor L^l T^{-3} \right \rfloor$$

Q.2 (3)

Area under curve from to 4 s



gives displacement = $\frac{1}{2} \times 10 (4 + 1) = 25 \text{ m}$

$$Vm = \frac{16}{1} = 16 \text{ km/h}$$

$$tup = \frac{5}{12} = \frac{5}{12} \, hr$$

$$tdown = \frac{5}{20} = \frac{1}{4}hr$$

$$t = tup + tdown = \left(\frac{5}{12} + \frac{1}{4}\right) = \frac{2}{3}hr$$

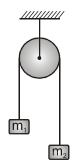
Q.4

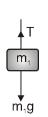
(1) $v \cos 30^{\circ} = 10 \cos 60^{\circ}$

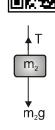
$$\Rightarrow v = \frac{10\cos 60^{\circ}}{\cos 30^{\circ}}$$

Q.5 (

FBD of m1 and m2





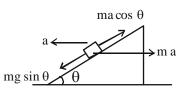


$$m1g - T = m1a$$
$$T - m2g = m2a$$

$$\mathrm{a} = \frac{(m_1 - m_2)}{m_1 + m_2} g = \frac{(5 - 4.8)}{(5 + 4.8)} g = \frac{0.2 \times 4.8}{9.8} \ = 0.2 \ \mathrm{m/s}$$

s2

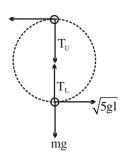




 $ma~cos~\theta=mg~sin~\theta$

$$a = g \tan \theta$$

Q.7 (3)



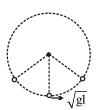


$$T_{L}-mg=\frac{m\Big(\sqrt{5gl}\,\Big)^{2}}{l}$$

 $T_L = 6 \,\text{mg}$ (at lowest point)

$$TU = 0$$

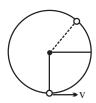
$$(P) \rightarrow (1)$$



both will oscillate

$$Q \rightarrow (3)$$

$$v=2\sqrt{gl}=\sqrt{4gl}$$



 $v\,{<}\,\sqrt{5gl}$ so the string will slack for a finite time

$$v = 3\sqrt{gl} = \sqrt{9gl}$$

$$(R) \rightarrow (2)$$

$$v_0^2 - v_T^2 = 4gl$$

(V0 = velocity at bottom most point



$$9gl - v_T^2 = 4gl \Rightarrow v_T^2 = 5gl$$

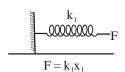
$$T + mg = \frac{mv_T^2}{l} \left(\because v_T^2 = 5gl \right)$$

$$T + mg = 5mg$$

T=4 mg (at highest point)

$$S \rightarrow (4)$$

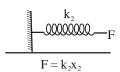
Q.8 (2)





$$\mathbf{w}_1 = \frac{1}{2} \mathbf{k}_1 \mathbf{x}_1^2$$

$$=\frac{F^2}{2k_1}$$



Given, $w_1 > w_2$

$$\frac{F^2}{2k_1} > \frac{F^2}{2k_2}$$

$$\therefore k2 > k1$$

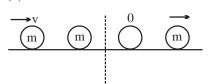
If stretched by same length, $w_1 = \frac{1}{2}k_1x^2$

$$\mathbf{w}_2 = \frac{1}{2}\mathbf{k}_2\mathbf{x}^2$$

k2 > k1

: statement-I is false.

Q.9 (2)





change in linear momentum = area under f-t curve

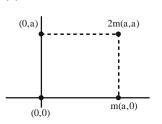
$$=\frac{1}{2}\left(T+\frac{T}{2}\right)F_0=\frac{3F.T}{4}$$

Change in linear momentum = mv

$$\frac{3F_0T}{4} = mv$$

$$F_0 = \frac{4mv}{3T}$$

Q.10





$$\boldsymbol{x}_{cm} = \frac{m_{1}\boldsymbol{x}_{1} + m_{2}\boldsymbol{x}_{2} + m_{3}\boldsymbol{x}_{3} + m_{4}\boldsymbol{x}_{4}}{m_{1} + m_{2} + m_{3} + m_{4}}$$

$$x_{cm} = \frac{m(0) + m(a) + 2m(a) + 2m(0)}{m + m + 2m + 2m}$$
$$= \frac{3ma}{6m} = \frac{a}{2}$$

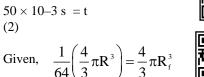
$$y_{cm} = \frac{m(0) + m(0) + 2m(a) + 2m(a)}{6m} = \frac{4ma}{6m} = \frac{2}{3}a$$

$$r_{com} = \left(\frac{a}{2}, \frac{2a}{3}\right)$$

$$2 \times 40 \times 10 - 3 \times 10 = 16 \text{ t}$$

$$50 \times 10 - 3 \text{ s} = \text{t}$$







$$Rf = \frac{R}{4}$$

As the net force is towards the centre of the earth, so the torque about the centre of the earth will be zero, :. Angular momentum will be conserved

 $I1\omega 1 = I2\omega 2$

$$I_{_1}\!\left(\frac{2\pi}{T_{_1}}\right) = I_{_2}\!\left(\frac{2\pi}{T_{_2}}\right)$$

$$\frac{2}{5}$$
m(R²)× $\frac{1}{24}$ = $\frac{2}{5}$ m($\frac{R}{4}$)²× $\frac{1}{T}$

$$T = \frac{24}{16} = 1.5 \text{ hr}$$

P.E. =
$$\frac{1}{2}kA^2$$



$$24 = \frac{1}{2}k(2)^2$$

$$\Rightarrow$$
 k = $\frac{24 \times 2}{(2)^2}$ = 12 N/m

Q.14

When the string vibrates in loops n,



its frequency is, $v_n = \frac{nv}{2T}$

where L is the length of the string and v is the velocity of the wave.

... When the string fixed at its both ends vibrates in 1 loop, 2 loops, 3 loops and 4 loops, the frequencies are in the ratio 1:2:3:4

Q.15 (3)

Frequency of vibration of string, $f = \frac{1}{2l} \sqrt{\frac{T}{II}}$

Let say frequency of tuning fork is f0

$$f1 = \frac{\sqrt{144}}{2l\sqrt{\mu}} = \frac{12}{2l\sqrt{\mu}}$$



$$f2 = \frac{\sqrt{169}}{2l\sqrt{\mu}} = \frac{13}{2l\sqrt{\mu}}$$

$$\frac{f_1}{f_2} = \frac{12}{13}$$
 (i)

Given that,

f0 - f1 = 6 and f2 - f0 = 6

putting the value of f1 and f2 in equation (i)

$$\frac{f_0 - 6}{f_1 + 6} = \frac{12}{13}$$

$$f0 = 150$$

Q.16 (2)

 $\lambda T = constant$





$$\frac{\lambda_1}{\lambda_2} = \frac{T_2}{T} \Rightarrow \frac{7000}{\lambda_2} = \frac{3500}{2500}$$

$$\lambda 2 = 5000 \text{Å}$$

Q.17

$$Q = \Delta U + w$$

$$Q = nCP\Delta T$$

$$= n \left(\frac{7}{2}R\right) \Delta T$$



$$= \frac{7}{2} nR\Delta T \qquad (P\Delta V = nR\Delta T = 200J)$$

$$=\frac{7}{2}\times200=700$$
J

(4)

For adiabatic process

$$p^{\scriptscriptstyle 1-\gamma}T^{\scriptscriptstyle \gamma}=const$$

$$P_1^{1-\gamma} T_1^{\gamma} = P_2^{1-\gamma} T_2^{\gamma}$$

$$(4)^{1-\frac{5}{3}}(300)^{\frac{5}{3}} = P_2^{1-\frac{5}{3}}(600)^{\frac{5}{3}}$$

$$\left(\frac{P_2}{4}\right)^{\frac{-2}{3}} = \left(\frac{300}{600}\right)^{\frac{5}{3}}$$

$$\left(\frac{P_2}{4}\right)^{\frac{-2}{3}} = \left(\frac{1}{2}\right)^{\frac{5}{3}}$$

$$P_2^{-\frac{2}{3}} = (4)^{\frac{-2}{3}} (2)^{-\frac{5}{3}}$$

$$\Rightarrow P_2^{-\frac{2}{3}} = 2^{-\frac{9}{3}} = 2^{-3}$$

$$P_2^{\frac{2}{3}} = 2^3$$

$$P_2 = 2^{\frac{9}{2}}$$
 atm

Q.19 (4

Pressure constant and volume is decreasing

So,
$$\Delta V = \Theta ve$$

$$\therefore W = P\Delta V$$
$$= \Theta ve$$





$$Y = \frac{FL}{A\Delta L} = \frac{FL}{\pi r^2 \Delta L}$$

$$\frac{Y_1}{Y_2} = \frac{r_2^2}{r_1^2}$$

$$\frac{R_B}{R_S} = \sqrt{\frac{Y_S}{Y_B}} = \sqrt{\frac{2 \times 10^{10}}{1 \times 10^{10}}} = \sqrt{2}$$

$$R_S = \frac{R_B}{\sqrt{2}}$$

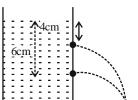
$$\Delta \ell l = \Delta \ell 2$$

$$\ell \alpha 1 \Delta T 1 = \ell \alpha 2 \Delta T 2$$

$$\frac{\alpha_1}{\alpha_2} = \frac{\Delta T_2}{\Delta T_1}$$
; $\frac{4}{3} = \frac{T - 30}{180 - 30}$

$$T = 230oC$$







Range =
$$\sqrt{2h(H-h)}$$

As both are having same range.

So,

$$h1(H - h1) = h2(H - h2)$$

$$4(H - 4) = 6(H - 6)$$

$$H-4=\frac{3}{2}(H-6)$$

$$H - 4 = \frac{3H}{2} - 9$$

$$\frac{H}{2} = 5$$

$$H = 10 \text{ cm}$$

Q.23 (1)

Rise
$$h = \frac{2T\cos\theta}{r\rho g}$$



$$g_{moon} = \frac{1}{6}g_{earth} \Rightarrow h_{moon} = 6h_{earth}$$

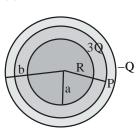
Q.24 (1)

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



If angle of contact is zero, meniscus will be flat. Angle of contact will be obtuse for mercury glass pair and meniscus will be downward concave.

Q.25 (3)

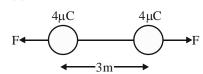




$$E_{p} = \frac{K.3Q}{R^{2}}$$

$$E_{P} = \frac{3Q}{4\pi\epsilon_{0}R^{2}}$$

Q.26 (1





When string is cut



F = ma

$$\frac{kq_1q_2}{r^2} = ma$$

$$a = \frac{kq_1q_2}{mr^2} = \frac{9 \times 10^9 \times 4 \times 10^6 \times 4 \times 10^{-6}}{8 \times 10^{-3}(3)^2}$$

a = 2 m/s

Q.27 (4)





Force between the plates of the capacitor

$$F = \frac{Q^2}{2A\epsilon_0}$$

Force between the plates of the capacitor is independent of medium

: Assertion is false.

Electric field between the plates $\,=\,\frac{Q}{2A\epsilon_{_{o}}} + \frac{Q}{2A\epsilon_{_{o}}}$

$$=\frac{Q}{A\epsilon_o}$$

when dielectric is filled $E' = \frac{Q}{kA\epsilon_o}, E' \downarrow$

E > E'

isolated capacitor : Q = const

$$Q = CV$$

dielectric inserted , $C \uparrow V \downarrow E \downarrow$

Q.28 (2

Apply KCL

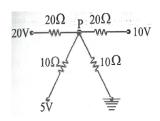
Sum of all current at point P = 0



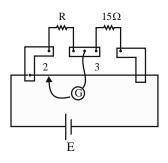
$$\therefore \quad \frac{V_p - 20}{20} + \frac{V_p - 10}{20} + \frac{V_p - 0}{10} + \frac{V_p - 5}{10} = 0$$

$$6VP = 20 + 10 + 2(5)$$

$$V_{\rm p} = \frac{40}{6} = \frac{20}{3} V$$



Q.29 (4)





$$\frac{R}{2} = \frac{15}{3}$$

$$R = 10\Omega$$

$$R = \frac{\rho \ell}{A} = 10$$

$$\rho = \frac{10A}{\ell} = \frac{10 \times 0.3 \times 10^{-6}}{1.5} = 2 \times 10^{-6} \Omega m$$

Q.30 (





Net magnetic field at point 0 is

magnetic field due to an arc $B = \frac{\mu_0 i}{2\pi} \left(\frac{\theta}{2\pi} \right)$

$$B0 = B1 + B2 + B3$$

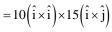
$$=0+\frac{\mu_0 i}{2R}\bigg(\frac{\pi/2}{2\pi}\bigg)+\frac{\mu_0 i}{4\pi R}~~\otimes$$

$$= \frac{\mu_0 i}{8 R} + \frac{\mu_0 i}{4 \pi R} \; \otimes \; = \frac{\mu_0 i}{4 R} \bigg(\frac{1}{2} + \frac{1}{\pi} \bigg) \; \otimes$$

Q.31 (1)

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

$$= \left(50\hat{i}\right) \times \left(0.2\hat{i} + 0.3\hat{j}\right)$$



$$=0+15\hat{k}$$

$$=15\hat{k} N-m$$

Q.32 (1)

$$L = \mu_0 n^2 V = \mu_0 \frac{N^2 A}{\ell}$$



$$= \frac{4\pi \times 10^7 \times 5000 \times 5000 \times 0.02}{1} = 0.2 \ \pi \ \text{Henery}$$

$$L1 = 84, L2 = 44$$

$$M = K\sqrt{L_1L_2}$$



$$0 \le K \le 1$$

$$0 \le K\sqrt{L_1L_2} \le \sqrt{L_1L_2}$$

$$0 \le M \le \sqrt{8 \times 4}$$

$$0 \le M \le 5.66$$

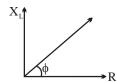
So, the value of mutual inductance may be 5H.

Q.34 (2

$$XL = \omega L$$

$$=2\pi fL$$





$$=2\pi\times\frac{100}{\pi}\times\frac{25}{1000}=5\Omega$$

$$R = 5\Omega$$

$$\tan \phi = \frac{X_L}{R} = \frac{5}{5} = 1 \implies \phi = 45^\circ$$

Q.35



$$f_1$$
 f_2

$$f_2$$

$$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2}$$

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

$$\frac{1}{f} = \frac{3}{40} \Rightarrow f = \frac{40}{3} \text{cm}$$

Q.36

(2)

nr = refractive index of rarrer medium nd = refractive index of denser medium.

$$\sin c = \frac{n_r}{n_d}$$

$$\sin C = 0.75$$

$$\sin c = \frac{3}{4} = \frac{n_r}{n_d}$$

$$\tan \theta = \frac{n_d}{n_r}$$

$$\tan \theta = \frac{4}{3}$$

$$\theta=53^o$$

$$y = 4\beta = 1.2 \times 10-2$$

$$\beta = 0.3 \times 10 - 2$$

$$\frac{\lambda\Delta}{d} = 0.3 \times 10^{-2}$$

$$\frac{\lambda(1.4)}{0.28 \times 10^{-3}} = 3 \times 10^{-3}$$

$$\lambda = \frac{3 \times 0.28 \times 10^{-6}}{1.4} \text{ m} = 600 \text{ nm}$$

Q.38 (1)

$$eV_{S} = \frac{hc}{\lambda} - \phi$$

For $\lambda = 200 \text{ nm}$

$$eV_1 = \frac{1240}{200} - \phi$$
 ... (1)

For $\lambda = 400 \text{ nm}$

$$eV_2 = \frac{1240}{400} - \phi$$
 ... (2)

$$e(V_1 - V_2) = \left(\frac{1240}{200} - \frac{1240}{400}\right) eV$$

$$V_1 - V_2 = \frac{1240}{400}$$

$$V1 - V2 = 3.1 V$$

Q.39 (3)

$$T = \frac{2\pi r}{v}$$



$$T\alpha \frac{\left(\frac{n^2}{z}\right)}{\left(\frac{z}{n}\right)} \qquad \Rightarrow \qquad T\alpha \frac{n^3}{z^2}$$

$$\frac{T_1}{T_2} = \frac{n_1^3}{n_2^3} \qquad \Rightarrow \qquad \frac{12.8 \times 10^{-16}}{T_2} = \left(\frac{2}{3}\right)^3$$

$$T_2 = \frac{12.8 \times 10^{-16} \times 27}{8} = 43.2 \times 10^{-16} \text{ sec}$$

$$f_2 = \frac{1}{T_2} = \frac{1}{43.2 \times 10^{-16}} = \frac{100 \times 10^{14}}{43.2} = 2.3 \times 10^{14} \text{s}^{-1}$$

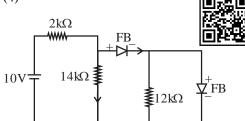
Q.40 (2)

As the density of nucleus is independent of atomic mass number. So, the density of all the nuclei is same.

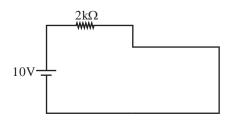


$$R = R_0 A^{\frac{1}{3}}$$

Reason is incorrect while assertion is correct.



Both the diodes are in forward biased condition and diodes are ideal. So, it can be replaced by wire.



As both the resistance 12 k Ω and 14 k Ω are short circuited. So no current flows through them.

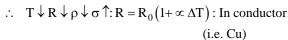
$$\therefore$$
 I1 = (

$$I_2 = \frac{10}{2k\Omega} = \frac{10}{2 \times 10^3} = 5\text{mA}$$

Q.42

for Cu : $\alpha = \bigoplus ve (\because conductor)$

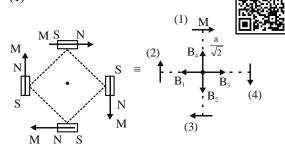
for Ge : $\alpha = \Theta_{Ve}$ (: semi conductor)



but for semiconductor like Ge a is negative, so on decrease in temperature resistance increases.

: on decreasing the temperature conductivity of Cu increases while conductivity of Si decreases

Q.43 (1)



As, the dipole moment of each bar magnet is same and they are located at the same distance from the field point on equitorial position

$$\therefore |B1| = |B2| = |B3| = |B4| = B = \frac{\mu_0 M}{4\pi r^2}$$

:. Bnet =
$$\vec{B}_1 + \vec{B}_2 + \vec{B}_3 + \vec{B}_4$$

$$= -B\hat{i} + B(-\hat{i}) + B\hat{i} + B(\hat{i})$$

$$= (B - B)\hat{i} + (B - B)\hat{j} = 0$$

Q.44

Direction of EMW will be perpendicular to both \vec{E} and \vec{B} . It is given by poynting



vector
$$\vec{S} = \frac{1}{\mu_0} (\vec{E} \times \vec{B})$$

Q.45 (1)

Load
$$m = 50 \text{ kg}$$
, $\ell = 3 \text{ m}$

Pitch = 1mm,
$$A = 10-5 \text{ m}2$$

In order to restore the horizontal position of spirit leaves quarter turn is given

$$\Delta \ell = \frac{1}{4} (1 \, \text{mm}) = 0.25 \, \text{mm}$$

$$\Delta \ell = \frac{F\ell}{Ay}$$

$$Y = \frac{50 \times 10 \times 3}{10^{-5} \times \frac{1}{4} \times 10^{-3}} = 6 \times 10^{11} \text{ N/m}^2$$

Q.46

Nitrogen can't be converted to ammonium sulphate under the Reaction condition in nitro or diazo groups present in the ring.

Q.47 (1)

Angular Node =
$$\ell$$

Radial node =
$$n - \ell - 1$$

Total
$$node = n-1$$

$$5S:$$
 A.N. = 0

$$R.N. = 5 - 0 - 1 = 4$$

$$T.N. = 5 - 1 = 4$$

$$3dyz: A.N. = 2$$

R.N.
$$= 3 - 2 - 1 = 0$$

$$T.N. = 3 - 1 = 2$$

$$4dxy: A.N. = 2$$

$$R.N. = 4 - 2 - 1 = 1$$

$$T.N. = 4 - 1 = 3$$

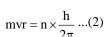
$$3p:$$
 A.N. = 1

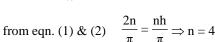
$$R.N. = 3 - 1 - 1 = 1$$

$$T.N. = 3 - 1 = 2$$

Q.48

$$mvr = 2 \times \frac{h}{\pi} \dots (1)$$





rom eqn. (1) & (2)
$$\frac{\pi}{\pi} - \frac{\pi}{\tau}$$

$$KE = -T.E.$$

$$KE = -\left(-13.6 \times \frac{1}{16}\right)$$

$$KE = 0.85 \text{ eV}$$

Q.49 (3)

> Cs is most electro positive element because it has lowest value of I.P.



Q.50 (3)

E.N. of $P \approx H$



Q.51 (3)

> Promotion of electron is not essential condition prior to hybridisation.



Q.52 C₂ (12e[⊙])

$$\sigma 1s^2 \sigma^* 1s2 \sigma 2s^2 \sigma^* 2s^2 \frac{\pi 2p_x^2 \approx \pi 2p_y^2}{\sigma \log_2 \pi \text{ bonds}}$$



B.O. = 2

No – unpaired $e^{\odot} \Rightarrow$ diamagnetic

molecules in which 14 or less than 14e^o are present Show S - P mixing.

- Q.53
 - (i) $\Delta G_{\text{syst}} = -T\Delta S$



(ii) $W_{\text{rev.Isothermal}} = -nRT \ell n \frac{V_2}{V_1}$

(iii) $\ln k RT = \Delta H^{\circ} - T\Delta S^{\circ} \Rightarrow \Delta G^{\circ} = RT \ln k$

[correct is $\Delta G^{\circ} = -RT \ln k$]

(iv)
$$k = e^{-\Delta G^{\circ}/RT}$$

Q.54 (2)



 $\Delta H_{Neut.}$ = Neut . heat of SA SB \times equivalent of L.R. = $-57.3\times100\times10^{-3}$

=-5.73

equivalent of HCl = $300 \times 1 = 300$

equivalent NaOH = $100 \times 1 = 100$ (L.R)

- Q.55
 - $\Delta H_r^{\circ} = \Delta H_f^{\circ}$ when



- . 1 mole product is formed
- . product is formed by its elements in standard state
- . Elements is prasent in most stable form
- Q.56 (4)



$$N_2O_4 \Longrightarrow 2NO_2$$

t = 01mol



at eq. 1-x2x(x = 0.5)total moles at eq. = 1 + x = 1 + 0.5 = 1.5

$$k_{p} = \frac{\left(\frac{2x}{1+x} \times 1\right)^{2}}{\left(\frac{1-x}{1+x} \times 1\right)}$$

$$k_p = \frac{\left(\frac{1}{1.5}\right)^2}{\frac{0.5}{1.5}} = \frac{1}{\left(1.5\right)^2} \times \frac{1.5}{0.5}$$

$$k_p = \frac{1}{1.5 \times 0.5} = \frac{1}{0.75}$$

$$k_p = \frac{4}{3}$$

 $\Delta G^{o} = -2.303 \text{ RT log k}_{equation}$

$$= -2.303 \times 8.31 \times 333 \times \log \frac{4}{3}$$

= -765.11 J/mol

Q.57 (2) $Ba(OH)_2 \rightarrow Ba^{2+} + 2OH^{-}$





$$- \frac{10^{-6}}{2}M \qquad 2 \times \frac{10^{-6}}{2}M$$

 $[OH^{-}] = 10^{-6}M$

pOH = 6

pH = 14 - 6 = 8



$$PbCl_2 \Longrightarrow Pb^{+2} + 2Cl^{-1}$$



 $NaCl \rightarrow Na^+ + Cl^-$

0.1 0.1

 $K_{sp} = S(2S + 0.1)^2 \{2S << 0.1\}$ (PbCl₂)

 $K_{\rm sp} = \tilde{S}' \times 10^{-2}$

$$S'_{\text{New}} = \frac{K_{\text{sp}}}{10^{-2}} = \frac{4 \times 10^{-6}}{10^{-2}} = 4 \times 10^{-4}$$



Q.59

Moleclar wieght

Equivalent weight = $\frac{\text{No. of electrons involved in reaction}}{\text{No. of electrons involved in reaction}}$

Molecular weight = Equivalent-weight \times No. of electrons involved in reaction

KMnO₄ in acidic medium,

 $MnO_4^- 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$

Number of electrons involved = 5

Therefore, Molecular weight = $5 \times \text{Equivalent weight}$

- **Q.60** (4)
 - (1) BF, has zero dipole moment while NH₂ has non zero dipole moment.



- (2) Dipole moment of NH₃ is greater than that of BF₃.
- (3) BF₂ molecule is planar, while the NH₂ is pyramidal in shape.
- (4) All are correct statement.
- Q.61

Heterocyclic compound :- Compound in which ring

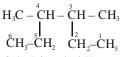
is formed by more than one type of atoms.



Homocyclic Aromatic

6 π $e^{\scriptscriptstyle \odot}$ in complete cyclic Resonance

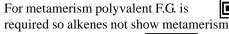
Q.62 (4)





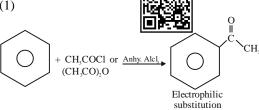
3,4 - Dimethyl Hexane

Q.63 (1)





Q.64 (1)



Q.65 SO₂ is an electrophile during sulphonation.



Q.66 Nitro benzene {highly deactivated ring} does not undergo friedel craft reaction.



Q.67

$$K_{H} \propto \frac{1}{solubility}$$



 $K_H : O_2 < H_2 < N_2 < He$ $S: O_2 > H_2 > N_2 > He$ option (4)

Q.68 (3)



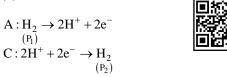
NaOH = $10\% \frac{\text{W}}{\text{W}}$

 $H_2(P_1) \rightarrow H_2(p_2)$

10 g NaOH is in 100 g solution

$$M = \frac{\% \times d \times 10}{G.M.M} = \frac{10 \times 1.2 \times 10}{40} = 3M$$

Q.69





$$E = E^{\circ} - \frac{RT}{nF} \log \frac{H_2(P_2)}{H_2(P_1)}$$

$$E = \frac{RT}{2F} \log \frac{P_1}{P_2}$$

Q.70 (1)

reducing power ∞ SOP

Q.71 (3)

$$R.O.R. = \frac{1}{5} \frac{d[C]}{dt}$$



ROR = $\frac{1}{5} \times 4.5 \times 10^{-7} = 0.9 \times 10^{-7} = 9 \times 10^{-8} \text{ mol } L^{-1} \text{ S}^{-1}$

Q.72

$$\ln k = \ln A - \frac{E_a}{RT}$$



slope = $-\frac{E_a}{R}$ & A is constant

And plot $\ln k \operatorname{vs} \frac{1}{T}$ is a straight line

Q.73 $[A]_0 = 800 \text{ M}$ $[A]_{t}^{0} = 50 \text{ M}$ $t = 2 \times 10^{-4} \text{ sec.}$



 $k = \frac{2.303}{2 \times 10^{-4}} \log \frac{800}{50} = \frac{2.303}{2 \times 10^{-4}} \log 2^4$

$$= \frac{2.303}{2 \times 10^{-4}} \times 4 \times 0.30 = 1.38 \times 10^{4} \quad \text{option (3)}$$

Q.74

Due to inert pair effect stability of +3 oxidation state in group 15 increases



on moving down the group. From As to Bi only a small increase in covalent Radii is observed due to the Present of filled d and f orbitals in heavier members.

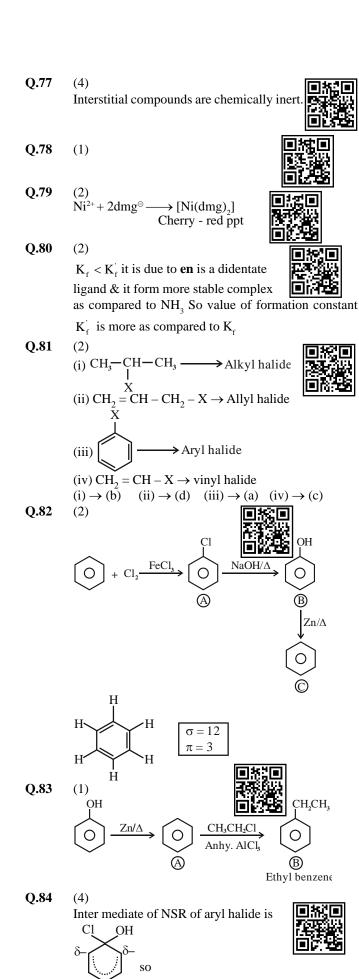
Q.75 Mn₂O₇ is a covalent compound

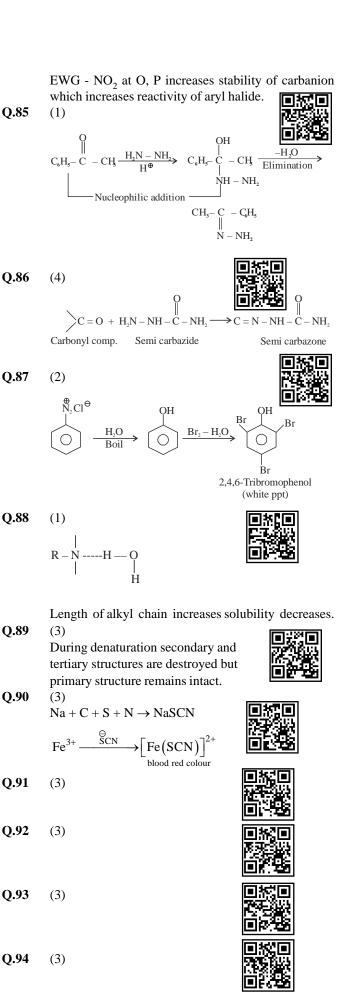


Q.76 $\operatorname{Cr}_2 \operatorname{O}_7^{2-} \Rightarrow 2x - 14 = -2$ x = +6 $\operatorname{MnO}_4^- \Rightarrow x - 8 = -1$



 $VO_3^- \Rightarrow x - 6 = -1$ x = +5 $FeF_6^{3-} \Rightarrow x - 6 = -3$ x = +3





Q.95	(4)		Q.111	(4)	
Q.96	(1)		Q.112	(1)	
Q.97	(3)		Q.113	(4)	
Q.98	(2)		Q.114	(2)	
Q.99	(4)		Q.115	(4)	
Q.100	(2)		Q.116	(1)	
Q.101	(2)		Q.117	(4)	
Q.102	(1)	□ 被 □□ 使 型	Q.118	(1)	
Q.103	(4)		Q.119	(4)	
Q.104	(3)		Q.120 NEW N	NCERT Pg. No -7, 9, 15 Pollen grains are generally spheric	
Q.105	(3)			measuring about 25-50 micrometer The hard outer layer called the ex- sporopollenin. Orchid, papaya & watermelon has	tine is made up of
Q.106	(3)		Q.121	Castor and maize are monoecious. (1)	
Q.107	(2)		Q.122	(1)	
Q.108	(3)		Q.123	(2)	
Q.109			Q.124	(4)	
Q.110	(3)		Q.125	(2)	

Q.126 (2) Q.137 (3) Effluent from sec. treatment can be discharged in water bodies. Q.138 (4) Q.127 NEW NCERT Pg. No. - 41 (2) Physalia and Gorgonia both the organisms are the members of phylum coelenterata (cnidaria) Q.128 (2) Q.139 NEW NCERT Pg. No. - 40, 41, 42, 43 Metamerism with Nereis, cnidoblasts with Meandrina, ciliated comb plates with 0.129 (4) Pleurobrachia and water canal system with sycon **Q.140** (1) Q.130 NEW NCERT Pg. No. - 43 (3) NEW NCERT Pg. No. - 182 In annelids, for e.g. earthworm In some children ADA deficiency can be the body is metamerically segmented with repetition cured by bone marrow transplantation; in others it can of at least some organs be treated by enzyme replacement therapy, in which Q.141 (2) functional ADA is given to the patient by injection. But the problem with both of these approaches that they are not completely curative. As a first step towards gene Q.142 (2) therapy, lymphocytes from the blood of the patient are grown in a culture outside the body. A functional ADA cDNA (using a retroviral vector) is then introduced into Q.143 (3) these lymphocytes, which are subsequently returned to the patient. However, as these cells are not immortal, the patient requires periodic infusion of such genetically engineered lymphocytes. However, if the gene isolate Q.144 (3) from marrow cells producing ADA is introduced into cells at early embryonic stages, it could be a permanent cure. Q.145 (2) Q.131 (1) RER is frequently observed in the cells actively involved in protein synthesis and secretion. Q.132 (2) Q.146 (1) Q.133 (1) Q.147 (4) Q.148 Q.134 (4) (2) Q.135 (2) NEW NCERT Pg. No - 224 0.149 (4) Three of the hotspots - Western Ghats and Sri Lanka, Indo-Burma and Himalaya - cover our country's exceptionally high Q.150 (3)biodiversity regions. Although all the biodiversity hotspots put together cover less than 2 per cent of the earth's land area. Q.151 (3) NEW NCERT Pg. No. - 184

> Each terminal bronchiole gives rise to a number of very thin, irregular-walled

Q.136

(2)

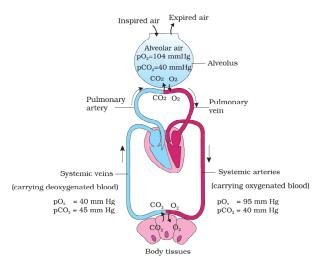
and vascularised bag-like structures called alveoli.

Q.152 (3)

NEW NCERT Pg. No. - 188



Here R labelling indicates deoxygenated blood in which partial pressure of carbon di oxide is more while partial pressure of oxygen is less as compare to partial pressure.



Q.153 (3) NEW NCERT Pg. No -195



Blood Group	Antigens on RBCs	Antibodies in Plasma	Donor's Group
A	A	anti-B	A, O
В	В	anti-A	B, O
AB	A, B	nil	AB, A, B, O
0	nil	anti-A, B	0

Q.154 (3)

NEW NCERT Pg. No -197



It has the same mineral distribution as that in plasma.

Lymph is a colourless fluid containing specialised lymphocytes which are responsible for the immune responses of the body.

Lymph is also an important carrier for nutrients, hormones, etc.

Q.155 (4) NEW NCERT Pg. No. - 206



Some of these structures are

mentioned here. Protonephridia or flame cells are the excretory structures in Platyhelminthes (Flatworms, e.g., *Planaria*), rotifers, some annelids and the cephalochordate – *Amphioxus*. Protonephridia are primarily concerned with ionic and fluid volume regulation, i.e., osmoregulation.

Q.156 (4)

NEW NCERT Pg. No. - 213



Malfunctioning of kidneys can lead to accumulation of urea in blood,

a condition called uremia, which is highly harmful and may lead to kidney failure.

Q.157 (4)



O.159 (1)

Q.160 (4)

Q.161 (3)

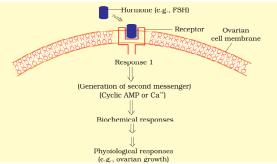
NEW NCERT Pg. No - 242, 243, 244,

A. Thymosin ii. Increase T-lymphocyte i. Emergency hormone

C. Melatonin iv.Sleep wake cycle D. Thyrocalcitonin iii. Blood calcium level

Q.162 (1) NEW NCERT Pg. No -248





Diagrammatic representation of the mechanism of hormone action: Protein hormone

Q.163 (2)



Q.164 (3)

NEW NCERT Pg. No - 32



Oogenesis is initiated during the embryonic development stage when

a couple of million gamete mother cells (oogonia) are formed within each foetal ovary. These cells start divisions and enter into prophase of the meiotic division and get temporarily arrested at that stage, called primary oocytes.

Q.165 (1) Q.166 (2) O.167 (2) NEW NCERT Pg. No. -47 Except for hepatitis-B, genital herpes and HIV infections, other diseases are completely curable if detected early and treated properly. Q.168 (1) Q.169 (3) Q.170 (3) Q.171 (3) NEW NCERT Pg. No. -106 VNTR as mini-satellite: Correct. DNA from a single cell for fingerprinting: Correct. Modern techniques use minute amounts of DNA. DNA polymorphism as the basis for fingerprinting: Correct. Variations in DNA sequences form unique patterns. (iii) is incorrect as DNA polymorphism does not vary across tissues of an individual. Q.172 (1) Q.173 (4)





Q.176 (2)

NEW NCERT Pg. No. - 135

Cytokine barriers: Virus-infected cells secrete proteins called interferons which protect noninfected cells from further viral infection.

Q.177 (4)

NEW NCERT Pg. No -134

Physical barriers: Skin on our body is the main barrier which prevents entry of the microorganisms. Mucus coating of the epithelium lining the respiratory, gastrointestinal and urogenital tracts also help in trapping microbes entering our body.

Q.178 (1)



Q.179 (1)



Q.180 (4)





Q.174 (3)

NEW NCERT Pg. No -117

