ANSWER KEY
FULL TEST-12

PHYSICS

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)					

BIOLOGY

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)

HINTS & SOLUTION

Q.1 (1)

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

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

$$a = \frac{[v]}{\left[t^2\right]} = \frac{\left[L^1T^{-1}\right]}{\left[T^2\right]} = \left[L^1T^{-3}\right]$$

Q.2 (3)

Area under curve from to 4 s

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

Q.3 (2)

Vm = $\frac{16}{1}$ = 16 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

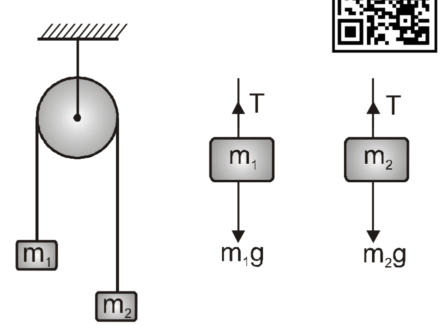
Q.4 (1)

v cos 30° = 10 cos 60°

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

Q.5 (1)

FBD of m1 and m2

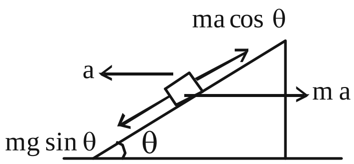


m1g – T = m1a ....(i)

T – m2g = m2a ....(ii)

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 m/s2

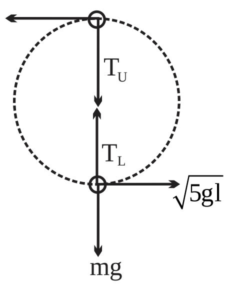
Q.6 (1)



ma cos θ = mg sin θ

a = g tan θ

Q.7 (3)

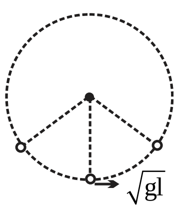


$$T_L - mg = \frac{m\left(\sqrt{5gl}\right)^2}{l}$$

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

TU = 0

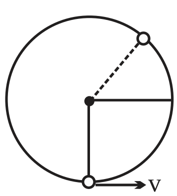
(P) → (1)



both will oscillate

Q → (3)

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



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

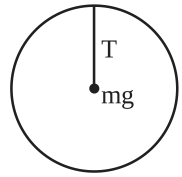
$v = 3\sqrt{gl} = \sqrt{9gl}$

(R) → (2)

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

(V0 = velocity at bottom most point

VT = velocity at topmost point)



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

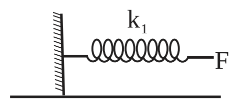
$T + mg = \frac{mv_T^2}{l} \left(\because v_T^2 = 5gl\right)$

$T + mg = 5mg$

T=4 mg (at highest point)

S → (4)

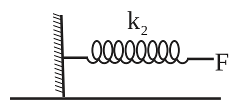
Q.8 (2)



$F = k_1x_1$

$w_1 = \frac{1}{2}k_1x_1^2$

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



$F = k_2x_2$

Given, $w_1 > w_2$

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

∴ k2 > k1

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

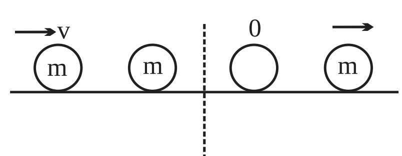
$w_2 = \frac{1}{2}k_2x^2$

k2 > k1

w2 > w1

∴ statement-I is false.

Q.9 (2)



change in linear momentum = area under f-t curve

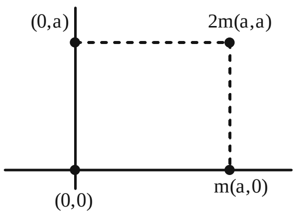
$= \frac{1}{2}\left(T + \frac{T}{2}\right)F_0 = \frac{3F.T}{4}$

Change in linear momentum = mv

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

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

Q.10 (3)



$$x_{cm} = \frac{m_1x_1 + m_2x_2 + m_3x_3 + m_4x_4}{m_1 + m_2 + m_3 + m_4}$$

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

$$= \frac{3ma}{6m} = \frac{a}{2}$$

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

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

Q.11 (2)

2 × 40 × 10–3 × 10 = 16 t

50 × 10–3 s = t

Q.12 (2)

Given, $\frac{1}{64}\left(\frac{4}{3}\pi R^3\right) = \frac{4}{3}\pi R_f^3$

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

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

I1ω1 = I2ω2

$$I_1\left(\frac{2\pi}{T_1}\right) = I_2\left(\frac{2\pi}{T_2}\right)$$

$$\frac{2}{5}m\left(R^2\right) \times \frac{1}{24} = \frac{2}{5}m\left(\frac{R}{4}\right)^2 \times \frac{1}{T}$$

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

Q.13 (1)

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

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

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

Q.14 (2)

When the string vibrates in loops n,

its frequency is, $\boldsymbol{\upsilon_n = \frac{nv}{2L}}$

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 = $\frac{1}{2l}\sqrt{\frac{T}{\mu}}$

Let say frequency of tuning fork is f0

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

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

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

Given that,

f0 – f1 = 6 and f2 – f0 = 6

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

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

f0 = 150

Q.16 (2)

λT = constant

$$\lambda \propto \frac{1}{T}$$

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

λ2 = 5000Å

Q.17 (4)

Q = ΔU + w

Q = nCPΔT

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

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

$$= \frac{7}{2} \times 200 = 700J$$

Q.18 (4)

For adiabatic process

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

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

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

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

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

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

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

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

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

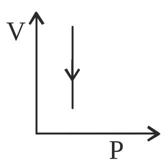
Q.19 (4)

Pressure constant and volume is decreasing

So, $\Delta V = \ominus$ve

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

$= \ominus$ ve



Q.20 (2)

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

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

$\frac{R_B}{R_S} = \sqrt{\frac{Y_S}{Y_B}} = \sqrt{\frac{2\times10^{10}}{1\times10^{10}}} = \sqrt{2}$

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

Q.21 (1)

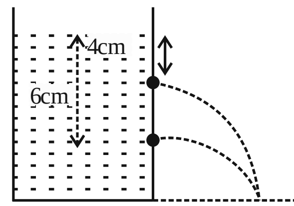
$\Delta\ell 1 = \Delta\ell 2$

$\ell\alpha 1\ \Delta T1 = \ell\alpha 2\Delta T2$

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

T = 230oC

Q.22 (1)



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 cm

Q.23 (1)

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

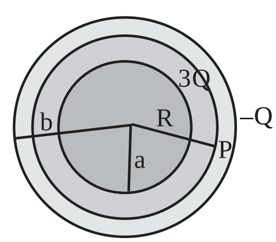
$g_{moon} = \frac{1}{6}g_{earth} \Rightarrow h_{moon} = 6h_{earth}$

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.

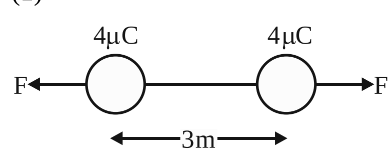
Q.25 (3)



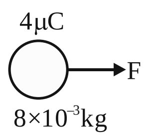
$E_P = \frac{K.3Q}{R^2}$

$E_P = \frac{3Q}{4\pi\varepsilon_0 R^2}$

Q.26 (1)



When string is cut



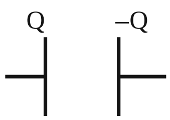
F = ma

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

$a = \frac{kq_1q_2}{mr^2} = \frac{9\times10^9\times4\times10^6\times4\times10^{-6}}{8\times10^{-3}(3)^2}$

a = 2 m/s

Q.27 (4)



Force between the plates of the capacitor

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

Force between the plates of the capacitor is independent of medium

∴ Assertion is false .

Electric field between the plates $= \frac{Q}{2A\varepsilon_o} + \frac{Q}{2A\varepsilon_o}$

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

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

$E > E'$

isolated capacitor : Q = const

Q = CV

dielectric inserted , C↑ V↓ E↓

Q.28 (2)

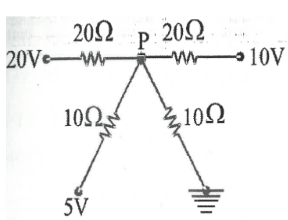
Apply KCL

Sum of all current at point P = 0

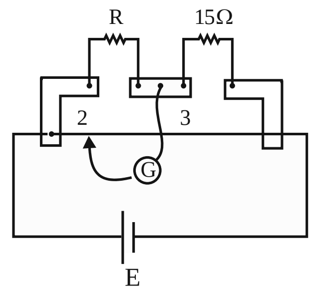
$\therefore \quad \frac{V_p-20}{20}+\frac{V_p-10}{20}+\frac{V_p-0}{10}+\frac{V_p-5}{10}=0$

6VP = 20 + 10 + 2(5)

$V_P = \frac{40}{6} = \frac{20}{3}V$



Q.29 (4)



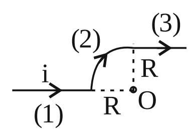
$\frac{R}{2} = \frac{15}{3}$

R = 10Ω

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

$\rho = \frac{10A}{\ell} = \frac{10\times0.3\times10^{-6}}{1.5} = 2\times10^{-6}\,\Omega m$

Q.30 (3)



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

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

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

Q.31 (1)

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

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

$= 10\left(\hat{i}\times\hat{i}\right)\times15\left(\hat{i}\times\hat{j}\right)$

$= 0 + 15\hat{k}$

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

Q.32 (1)

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

$= \frac{4\pi\times10^7\times5000\times5000\times0.02}{1} = 0.2\,\pi$ Henery

Q.33 (3)

L1 = 84, L2 = 44

$M = K\sqrt{L_1L_2}$

$0 \le K \le 1$

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

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

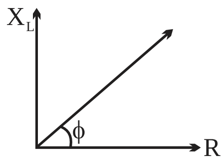
$$0 \le M \le 5.66$$

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

Q.34 (2)

$X_L = \omega L$

$= 2\pi f L$

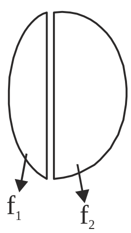


$$= 2\pi \times \frac{100}{\pi} \times \frac{25}{1000} = 5\Omega$$

$R = 5\Omega$

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

Q.35 (3)



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

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

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

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

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

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

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

$\theta = 53^\circ$

Q.37 (2)

y = 4β = 1.2 × 10–2

β = 0.3 × 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 λ = 200 nm

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

For λ = 400 nm

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

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

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

V1 – V2 = 3 .1 V

Q.39 (3)

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

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

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

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

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

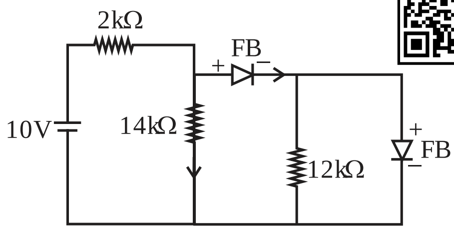
Q.40 (2)

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

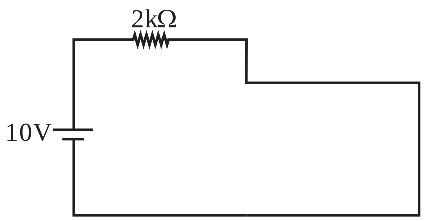
$$R = R_0A^{\frac{1}{3}}$$

Reason is incorrect while assertion is correct.

Q.41 (4)



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



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

$\therefore$ I1 = 0

$$I_2 = \frac{10}{2k\Omega} = \frac{10}{2\times10^3} = 5mA$$

Q.42 (1)

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

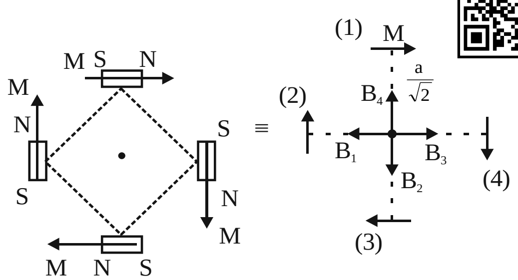
for Ge : $\alpha = \ominus ve$ ($\because$ semi conductor)

$\therefore \quad T\downarrow R\downarrow \rho\downarrow \sigma\uparrow : R = R_0(1+\propto \Delta T)$: In conductor (i.e. Cu)

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

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

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

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

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

Q.44 (1)

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 kg , ℓ = 3 m

Pitch = 1mm, A = 10–5 m2

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

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

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

$$Y = \frac{50\times10\times3}{10^{-5}\times\frac{1}{4}\times10^{-3}} = 6\times10^{11}\ N/m^2$$

Q.46 (1)

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 = ℓ

Radial node = n – ℓ – 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 (3)

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

$$mvr = n\times\frac{h}{2\pi} \quad ...(2)$$

from eqn. (1) & (2) $\frac{2n}{\pi} = \frac{nh}{\pi} \Rightarrow n = 4$

KE = – T.E.

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

KE = 0.85 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 (1)

C_2 (12$e^{\ominus}$)

$\sigma 1s^2\ \sigma^* 1s2\ \ \sigma 2s^2\ \ \sigma^* 2s^2\ \underbrace{\pi 2p_x^2 \approx \pi 2p_y^2}_{\text{only } 2\pi \text{ bonds}}$

B.O. = 2

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

molecules in which 14 or less than 14$e^{\ominus}$ are present Show S – P mixing .

Q.53 (3)

(i) $\Delta G_{syst} = -T\Delta S$

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

(iii) ln k RT = $\Delta H° - T\Delta S° \Rightarrow \Delta G° = RT$ lnk

[correct is $\Delta G° = -RT\ln k$]

(iv) $k = e^{-\Delta G°/RT}$

Q.54 (2)

$\Delta H_{Neut.}$ = Neut . heat of SA SB × equivalent of L.R.

$= -57.3 \times 100 \times 10^{-3}$

$= -5.73$

equivalent of HCl = 300 × 1 = 300

equivalent NaOH = 100 × 1 = 100 (L.R)

Q.55 (4)

$\Delta H_r^o = \Delta H_f^o$ when

. 1 mole product is formed

. product is formed by its elements in standerd state

. Elements is prasent in most stable form

Q.56 (4)

$$N_2O_4 \rightleftharpoons 2NO_2$$

t = 0 1mol –

at eq. 1–x 2x (x = 0.5)

total moles at eq. =1 + x = 1+ 0.5 = 1.5

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

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

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

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

$\Delta G° = -2.303$ RT log $k_{equation}$

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

= –765.11 J/mol

Q.57 (2)

$Ba(OH)_2 \rightarrow$	Ba^{2+} +	$2OH^-$
$\dfrac{10^{-6}}{2}$M	–	–
–	$\dfrac{10^{-6}}{2}$M	$2\times\dfrac{10^{-6}}{2}$M

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

pOH = 6

pH = 14 – 6 = 8

Q.58 (3)

$PbCl_2 \rightleftharpoons Pb^{+2} + 2Cl^-$

S 2S + 0.1

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

0.1 0.1

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

$(PbCl_2)$

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

$S'_{New} = \dfrac{K_{sp}}{10^{-2}} = \dfrac{4\times10^{-6}}{10^{-2}} = 4 \times 10^{-4}$

Q.59 (1)

Equivalent weight = $\dfrac{\text{Moleclar wieght}}{\text{No. of electrons involved in reaction}}$

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

$KMnO_4$ in acidic medium,

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

Number of electrons involved = 5

Therefore, Molecular weight = 5 × Equivalent weight

Q.60 (4)

(1) BF_3 has zero dipole moment while NH_3 has non zero dipole moment.

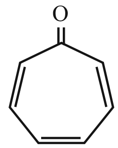
(2) Dipole moment of NH_3 is greater than that of BF_3.

(3) BF_3 molecule is planar, while the NH_3 is pyramidal in shape.

(4) All are correct statement.

Q.61 (4)

Heterocyclic compound :- Compound in which ring is formed by more than one type of atoms.



Homocyclic Aromatic

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

Q.62 (4)

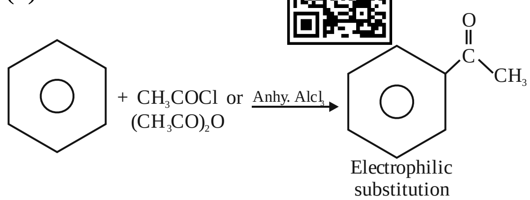
$$H_3C-\overset{4}{C}H-\overset{3}{C}H-CH_3$$
$$\overset{6}{C}H_3-\overset{5}{C}H_2 \quad \overset{2}{C}H_2-\overset{1}{C}H_3$$

3,4 - Dimethyl Hexane

Q.63 (1)

For metamerism polyvalent F.G. is required so alkenes not show metamerism.

Q.64 (1)



Q.65 (4)

SO_3 is an electrophile during sulphonation.

Q.66 (4)

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

Q.67 (4)

$$K_H \propto \frac{1}{\text{solubility}}$$

$K_H : O_2 < H_2 < N_2 < He$

$S : O_2 > H_2 > N_2 > He$

option (4)

Q.68 (3)

$$NaOH = 10\% \frac{w}{w}$$

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 (2)

$$A : \underset{(P_1)}{H_2} \rightarrow 2H^+ + 2e^-$$

$$C : 2H^+ + 2e^- \rightarrow \underset{(P_2)}{H_2}$$

$$\overline{H_2(P_1) \rightarrow H_2(p_2)}$$

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

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

Q.70 (1)

	SRP	SOP
P	0.7	–0.7
Q	–2.5	2.5
R	–1.3	1.3

reducing power $\propto$ SOP

Q > R > P

Q.71 (3)

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

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

Q.72 (3)

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

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

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

Q.73 (3)

$[A]_0 = 800$ M

$[A]_t = 50$ M

$t = 2 \times 10^{-4}$ sec.

$$k = \frac{2.303}{2\times10^{-4}}\log\frac{800}{50} = \frac{2.303}{2\times10^{-4}}\log 2^4$$

$$= \frac{2.303}{2\times10^{-4}} \times 4 \times 0.30 = 1.38 \times 10^4 \quad \text{option (3)}$$

Q.74 (4)

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 (4)

Mn_2O_7 is a covalent compound

Q.76 (2)

$Cr_2O_7^{2-} \Rightarrow 2x - 14 = -2$

x = +6

$MnO_4^- \Rightarrow x - 8 = -1$

x = +7

$VO_3^- \Rightarrow x - 6 = -1$

x = +5

$FeF_6^{3-} \Rightarrow x - 6 = -3$

x = +3

Q.126 (2)

Effluent from sec. treatment can be discharged in water bodies.

Q.127 (2)

Q.128 (2)

Q.129 (4)

Q.130 (3)

NEW NCERT Pg. No. - 182

ln some children ADA deficiency can be cured by bone marrow transplantation; in others it can be treated by enzyme replacement therapy, in which 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 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 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 from marrow cells producing ADA is introduced into cells at early embryonic stages, it could be a permanent cure.

Q.131 (1)

Q.132 (2)

Q.133 (1)

Q.134 (4)

Q.135 (2)

NEW NCERT Pg. No - 224

Three of the hotspots - Western Ghats and Sri Lanka, Indo-Burma and Himalaya - cover our country's exceptionally high biodiversity regions. Although all the biodiversity hotspots put together cover less than 2 per cent of the earth's land area.

Q.136 (2)

Q.137 (3)

Q.138 (4)

NEW NCERT Pg. No. - 41

Physalia and *Gorgonia* both the organisms are the members of phylum coelenterata (cnidaria)

Q.139 (2)

NEW NCERT Pg. No. - 40 , 41 , 42 , 43

Metamerism with *Nereis* , cnidoblasts with *Meandrina*, ciliated comb plates with *Pleurobrachia* and water canal system with sycon

Q.140 (1)

NEW NCERT Pg. No. - 43

In annelids , for e.g. earthworm the body is metamerically segmented with repetition of at least some organs

Q.141 (2)

Q.142 (2)

Q.143 (3)

Q.144 (3)

Q.145 (2)

RER is frequently observed in the cells actively involved in protein synthesis and secretion.

Q.146 (1)

Q.147 (4)

Q.148 (2)

Q.149 (4)

Q.150 (3)

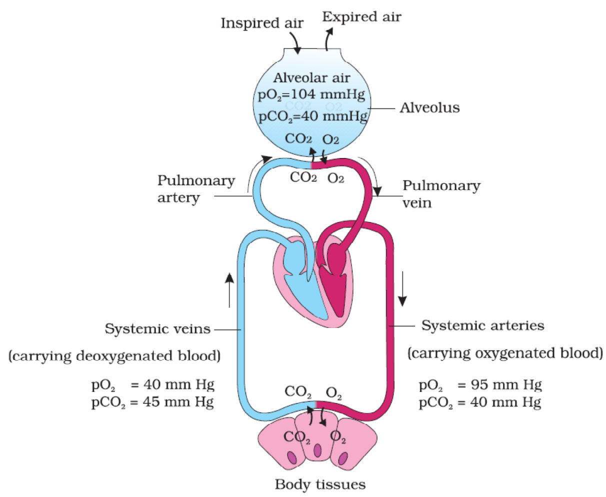
Q.151 (3)

NEW NCERT Pg. No. - 184

Each terminal bronchiole gives rise to a number of very thin, irregular-walled 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
B	B	anti-A	B, O
AB	A, B	nil	AB, A, B, O
O	nil	anti-A, B	O

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)

Q.158 (4)

Q.159 (1)

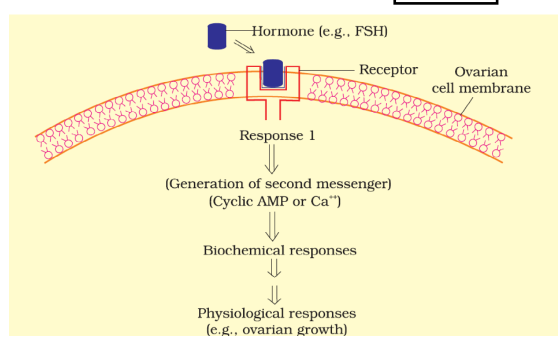
Q.160 (4)

Q.161 (3)

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

A. Thymosin ii. Increase T-lymphocyte
B. Epinephrine 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)

Q.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.

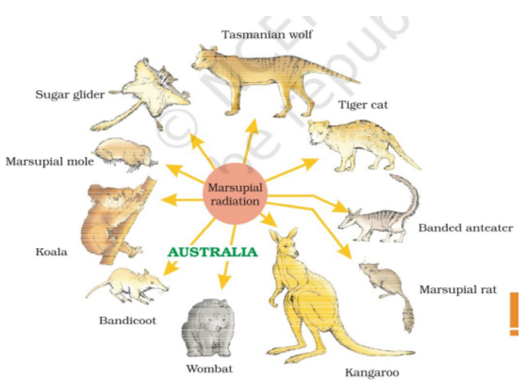
(iii) is incorrect as DNA polymorphism does not vary across tissues of an individual.

Q.172 (1)

Q.173 (4)

Q.174 (3)

NEW NCERT Pg. No -117



Q.175 (4)

Q.176 (2)

NEW NCERT Pg. No. - 135

Cytokine barriers : Virus-infected cells secrete proteins called interferons which protect non-infected 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 micro-organisms. 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)