MP Murlidhar Mohol & APMA initiative

Mission NEET 2025

TIME : 3 HRS. **PAPER - V** **MARKS: 720**

DATE : 27.04.2025

PCB : ENTIRE XI + XII NCERT

Note:

* Every correct answer (+4 Mark)
* Every wrong answer (–1 Mark)
* Not attempted question (0 Mark)

1. 4) $M \propto [C]^a [G]^b [h]^c$

$M \propto [LT^{-1}]a[M^{-1}L^3T^{-2}][ML^2T^{-1}]^c$

$M \propto [L]^{a+3b+2c} [M]^{c-b} [T]^{-a-2b-c}$

c –b = 1 (i), a + 3b + 2c = 0 (ii) –a – 2b – c = 0

a + 3b + 2c = 0

a + 2b + c = 0   a + 2b + c = 0 (iii)

b + c + = 0 (iv) from eq (1) (2) and (3)

From eq (i) & (iv)

$b = -\frac{1}{2}, c = \frac{1}{2}, a = \frac{1}{2}$

hence $M \propto [C]^{1/2} [G]^{-1/2} [h]^{1/2}$

2. 3) Particle velocity executing SHM is given by

by $v = \sqrt{A^2 - x^2}$

$v_1 = \omega \sqrt{A^2 - x_1^2}$ $v_2 = \omega\sqrt{A^2 - x_2^2}$

$v_1^2 = \omega^2 A^2 - \omega^2 - x_1^2$ $v_2^2 = \omega^2 \left(A^2 - x_2^2\right)$

$v_1^2 = \omega^2 A^2 - \omega^2 - x_1^2$ $v_2^2 = \omega^2 A^2 - \omega^2 x_2^2$

$v_1^2 - v_2^2 = \omega^2 x_2^2 - \omega^2 x^2$

$v_1^2 - v_2^2 = \omega^2 \left(x_2^2 - x_1^2\right)$

$\omega = \sqrt{\frac{v_1^2 - v_2^2}{x_2^2 - x_1^2}}$ $T = 2\pi\sqrt{\frac{x_2^2 - x_1^2}{v_1^2 - v_2^2}}$

3. 4) $R = \frac{u^2 \sin 2\theta}{g}$

$78.4 = (39.2)^2 \times \frac{\sin 2\theta}{9.8}, \sin 2\theta = \frac{1}{2}$

$\theta_1 = 15^0, \theta_2 = 75^0$

$t_2 = \frac{2 \times 39.2}{9.8} \sin 75^0 \quad t_1 = \frac{2 \times 39.2 \times \sin 15^0}{9.8}$

$t_2 - t_1 = 8 (\sin 75 - \sin 15)$

$t_2 - t_1 = 4\sqrt{2} \sec$

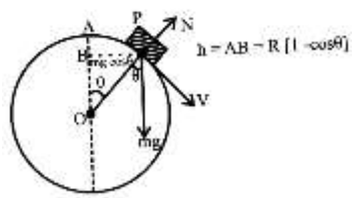
4. 1) $\Delta l = \frac{Fl}{Ay} \propto \frac{l}{r^2}$

a. $\frac{50}{0.25 \times 0.25 \times 10^{-6}}$ b. $\frac{100}{0.5 \times 0.5 \times 10^{-6}}$

c. $\frac{200}{1 \times 1 \times 10^{-6}}$ d. $\frac{300}{1.5 \times 1.5 \times 10^{-6}}$

A combination will have largest extension

5. 4)



Apply law of conservation of energy

$K_A + P_A = K_P + P_P$

$O + mgh = \frac{1}{2} nv_P^2 + O$ [assume PE = 0 at P]

$V_P^2 = 2gh$

$V_P^2 = 2gR [1 - \cos\theta]$ ...... (i)

$mg\cos\theta - N = \frac{mV_P^2}{R}$

Body to lose contact N = 0

$\cos\theta = \frac{m}{R} \times 2gR [1 - \cos\theta]$

$\cos \theta = 2 - 2 \cos \theta$

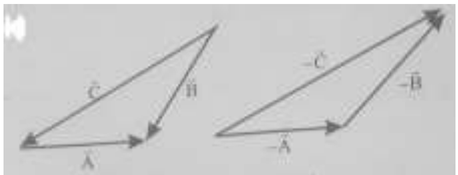
$\cos\theta = \frac{2}{3}$

We have to find value of "h"

$h = R [1 - \cos \theta]$

$= R\left[1 - \frac{2}{3}\right] \qquad h = \frac{R}{3}$

6. 3)



Vector's addition $-\vec{C} = \vec{A} + \left(-\vec{B}\right)$

$\vec{B} = \vec{A} + \vec{C}$

7. 4) This circuit represent the NAND gate

8. 4) Terminal velocity

$$v_{T_1} = \frac{2}{9}\frac{\left(\sigma_1 - l\right)}{\eta} r_1^2$$

$$v_{T_2} = \frac{2}{9}\frac{\left(\sigma_2 - l\right)}{\eta} r_2^2$$

$$v_{T_1} = v_{T_2}$$

$$\frac{2}{9}\frac{\left(8\times10^3 - 2\times10^3\right)}{\eta} r_1^2 = \frac{2}{9}\frac{\left(11\times10^3 - 2\times10^3\right)}{\eta} r_2^2$$

$$6\times10^3\ r_1^2 = 9\times10^3\ r_2^2$$

$$\frac{r_1}{r_2} = \sqrt{\frac{3}{2}}$$

9. 1) de – broglie wavelength $\lambda = \frac{h}{p} = \frac{h}{mv}$

$$m_{\propto} = 4m \quad m_d = 2m$$

$$v_{\propto} = v \qquad v_p = 2v$$

$$\lambda_{\propto} = \frac{h}{4m.v} \quad \lambda_d = \frac{h}{2m.2v}$$

$$\frac{\lambda_{\propto}}{\lambda_d} = \frac{1}{1}$$

10. 1) The susceptibility χ_m of diamagnetic substance is always negative. It is constant and does not vary with field or the temperature

11. 3) $\frac{1}{\lambda}=R\left[1-\frac{1}{n^2}\right]$

$\frac{1}{\lambda R}=1-\frac{1}{n^2}$

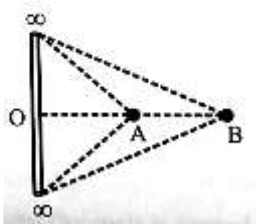
$\frac{1}{n^2}=1-\frac{1}{\lambda R}$

$\frac{1}{n^2}=\frac{\lambda R-1}{\lambda R}$

$n^2=\frac{\lambda R}{\lambda R-1}$

$n=\sqrt{\frac{\lambda R}{\lambda R-1}}$

12. 2)



Magnetic field due to straight wire at point A

$B_A=B=\frac{\mu_0 I}{2\pi\left(5\times10^{-2}\right)}$ .... (1)

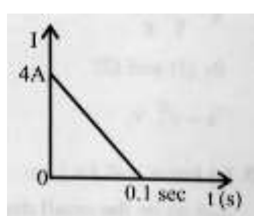
$B_B=\frac{\mu_0 I}{2\pi\times\left(20\times10^{-2}\right)}$ .... (2)

By (1) and (2)

$B_B=\frac{B}{4}$

13. 2) Charge induced in coil

q = (area under I – t graph)



$q=\frac{1}{2}\times4\times0.1=0.2$

$\text{Emf}=\frac{d\phi}{dt}$

$I.R.=\frac{d\phi}{dt}$

$d\phi=Idt.R$

$\phi=QR$

$\phi=0.2\times10$

$\phi=2Wb$

14. 4) Einstein's Photoelectric equation can be written as

$$hf = k + \phi$$

but k = eV_s, V_s, being stopping potential

$\therefore hf = eV_s + \phi$ .... (i)

So, $hf_1 = eV_1 + \phi$ ..... (ii)

and $hf_2 = eV_2 + \phi$ ..... (iii)

subtracting Eq. (ii) from Eq. (iii), we get

$$h(f_1 - f_2) = e(V_1 - V_2)$$

or $eV_2 = eV_1 - h(f_1 - f_2)$

or $V_2 = V_1 + \frac{h}{e}(f_2 - f_1)$

15. 3) Force = W = $\frac{GMm}{R^2}$ ...... (1)

$\frac{W}{16} = \frac{GMm}{(R+H)^2}$ ...... (2)

$(1) \div (2)$

$$16 = \left(\frac{R+H}{R}\right)^2$$

$$4 = \frac{R+H}{R}$$

4R = R + H

H = 3R

16. 2) $\frac{I_{max}}{I_{min}} = \frac{\left(\sqrt{I_1} + \sqrt{I_2}\right)^2}{\left(\sqrt{I_1} - \sqrt{I_2}\right)^2} = \frac{16}{9}$

$$\frac{\sqrt{I_1} + \sqrt{I_2}}{\sqrt{I_1} - \sqrt{I_2}} = \frac{4}{3}$$

$$3\sqrt{I_1} + 3\sqrt{I_2} = 4\sqrt{I_1} - 4\sqrt{I_2}$$

$$7\sqrt{I_1} = \sqrt{I_1}$$

$$\frac{\sqrt{I_1}}{\sqrt{I_2}} = \frac{7}{1}$$

$$\frac{I_1}{I_2} = \frac{49}{1}$$

17. 2) Escape velocity = $\sqrt{\frac{GM}{R}}$

$V_e = \sqrt{\frac{GM}{R}}$

$u = \sqrt{\frac{GM_P}{R_P}}$

$M_P = \frac{M}{2}, R_P = \frac{R}{4}$

$u = \sqrt{\frac{GM}{2 \times R} \times 4}$

$u = \sqrt{\frac{2GM}{R}}$

By (1) and (2)

$u = \sqrt{2}V_e$

18. 4) $V_{AB} = E_1 = k \times 300$ ..... (1)

$V_{AC} = E_1 - E_2 = k \times 100$ ..... (2)

By (1) and (2)

$\frac{E_1}{E_2} = \frac{3}{2}$

19. 1) Momentum of photon = $\frac{hv}{c}$

From the law of conservation of linear momentum

$P_{nucleus} = P_{photon}$

$Mv = \frac{hv}{c}$

$v = \frac{hv}{Mc}$

K.E. of nucleus = $\frac{1}{2}M\left[\frac{hv}{Mc}\right]^2 = \frac{h^2v^2}{2Mc^2}$

20. 4) $f = f_0 - \frac{f_0 t}{T}$

$f = \frac{dv}{dt} = f_0 - \frac{f_0 t}{T}$ $\left[a = f = \frac{dv}{dt}\right]$

$dv = f_0 dt - \frac{f_0 t dt}{T}$

Integrating both sides

$$v = f_0 t - \frac{f_0 t^2}{T \times 2}$$; t = 0, v = 0

$$v = f_0 t - \frac{f_0 t^2}{2T}$$ when f = 0

$$f_0 - \frac{f_0 t}{T} = 0\ ,\ t = T$$

$$v = f_0\, T - \frac{f_0 T^2}{2T}$$

$$v = \frac{f_0 T}{2}$$

21. 3) $V_y = u_y + gt$

$V_y = gt \quad u_y = 0$

$V_y = 10 \times 0.7 = 7 m/s$

$Vx = 4 m/s^2$

V= $\sqrt{V_x^2 + V_y^2}$

$= \sqrt{7^2 + 4^2}$

$= \sqrt{65}$

= 8 m/s

22. 1) Force – 0.1 × J/m

Let dx be the small displacement

dW = F. dx

Integrating both sides

$$\int_{20}^{30} dW = \int_{20}^{30} F.\, dx$$

$$W = \int_{20}^{30} -0.1x.dx$$

$K_f - K_i = 0.1 \left[\frac{x^2}{2}\right]_{20}^{30}$

$$K_f - \frac{1}{2} \times 10 \times (10)^2 = -\frac{0.1}{2}\left[x^2\right]_{20}^{30}$$

$$K_f - 500 = -\frac{1}{20} \times \left[900 - 400\right]$$

$K_f - 500 = -25$

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$K_f = 475$ J

23. 4) Frequency of the first O.T. of closed pipe of length l_1

$$f_1 = \frac{3v}{4l_1}$$

Frequency of the first O.T. of open pipe of length l_2

$$f_2 = \frac{v}{l_2}$$

$$\frac{3v}{4l_1} = \frac{v}{l_2}$$

$$\frac{l_1}{l_2} = \frac{3}{4}$$

24. 2) $l_1 = l_0$ $l_2 = nl_0$

If wire is elongated but its volume remains constant

$V_{initial} = V_{final}$

$$\pi r_0^2 l_0 = \pi r_2^2 n l_0$$

$$r_2^2 = \frac{r_0^2}{n}$$

$$R_0 = \rho \frac{l_0}{\pi r_0^2} \quad \text{.... (1)}$$

$$R'' = \rho \frac{n l_0}{\pi r_2^2} \quad \text{.... (2)}$$

By (1) and (2)

$R'' = n^2 R_0$

25. 4) m = 14 n

26. 4) The rays of light from two coherent sources superimpose each other an the screen forming alternate maxima (maximum intensity I_0) and minima (intensity zero). If the non-coherent sources superimpose there will be no maxima and minima instead the intensity will be $\frac{I_0}{2}$ throughout

27. 2) Area under acceleration displacement curve

$= \int a.\, dx$

$= \int \frac{dv}{dt}.dx$

$= \int_u^v v\, dv \quad \left[v = \frac{dx}{dt}\right]$

$= \left[\frac{v^2}{2}\right]_u^v$

$= \frac{1}{2}\left[v^2 - u^2\right]$

= change in K.E. energy per unit mass

28. 3) Refracting index of glass = $\frac{3}{2}$

Refracting index of water = $\frac{4}{3}$

$\mu_g = \frac{C}{2\times10^8}$ ..... (1)

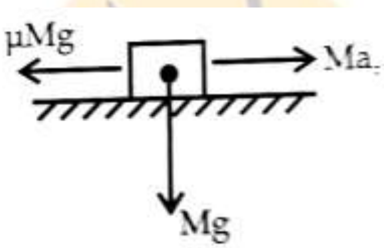
$\mu_w = \frac{C}{v}$ .... (2)

$\frac{v}{2\times10^8} = \frac{\mu_g}{\mu_w}$

$v = \frac{2\times10^8\times3\times3}{2\times4}$

v = 2.25×10^8 m/s

29. 2)



At equilibrium

$Ma_0 = \mu Mg$

$a_0 = \mu g$

$v^2 - u^2 = 2as$

$0 - (6)^2 = -2\,\mu g \times 9$ [- sign for retardation]

$\mu = 0.2$

30. 3) Voltage across two plates = $\frac{q_{net}}{C_{net}}$

$$40 = \frac{2 \times 200}{2 + C}$$

2 + C = 10

C = 8 μF

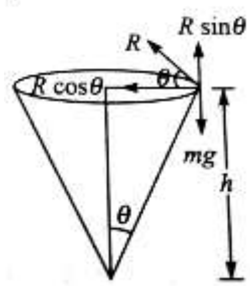
31. 1) Emf induced across the conductor

E = Bv l

= 0.9 × 7 × 0.4

= 2.52 V

32. 4) The particle is moving in circular path from



the figure mg = R sin ..... (i)

$$\frac{mv^2}{r} = R\cos\theta \quad ..... (ii)$$

From equation (i) and (ii) we get

$$\tan\theta = \frac{rg}{v^2} \text{ but } \tan\theta = \frac{r}{h}$$

$$\therefore h = \frac{v^2}{g} = \frac{(0.5)^2}{10} = 0.025 \text{ m} = 2.5 \text{cm}$$

33. 2) There is no volume change in process ab so ⇒ W = 0

Process bd, occurs at constant pressure ⇒ W by system

= P ($V_2 - V_1$) = 8 × 10^4

(5 × 10^{-3} – 2 × 10^{-3}) = 240 J

W_{abd} = 240 J Q_{abd} = 800 J

ΔU = Q – W = 800 – 240 = 560 J

Δ U is state function

W_{acd} = 3 × 10^4 (5 × 10^{-3} – 2 × 10^{-3}) = 90 J

Total heat added in the path acd

Q = ΔU + W

Q = 560 + 90 = 650 J

34. 2) $\omega = a - bt$

On comparing above equation with

$\omega = \omega_0 - dt$

Initial angular velocity = a

Angular retardation = b

$\therefore$ angle rotated before is stops is $\frac{a^2}{2b}$

$$\omega_f^2 - \omega_1^2 = -2b\theta$$

$$0 - a^2 = -2b\theta$$

$$\theta = \frac{a^2}{2b}$$

35. 4) Torque will be the maximum when $\theta = 90$

$$\tau_{max} = PE \sin 90^0$$

$$= qlE \;\therefore (P = q \times l)$$

$= 4 \times 10^{-8} \times 2 \times 10^{-4}$ (m) $\times 4 \times 10^8$

$= 32 \times 10^{-4}$ N - m

W = PE $[\cos\theta_1 - \cos\theta_2]$

Note when nothing is specified assume

$\theta_1 = 0^{0,}\, \theta_2 = 180^0$

= PE $[\cos 0^0 - \cos 180^0]$

= PE $[1 - \cos 180^0] \Rightarrow 2$ PE

W = 64×10^{-4} N – m

36. 3) Rope of length l has mass = m

Rope of hanging length l_1 has mass = $\frac{m}{l} l_1$

In equilibrium

Weight of hanging part = force of friction on part of rope

$= \frac{m}{l} l_1 g = \frac{\mu m}{g}(l - l_1)g$

$$l_1 g = \mu l g - \mu l_1 g$$

$l_1 (g + \mu g) = \mu l g$

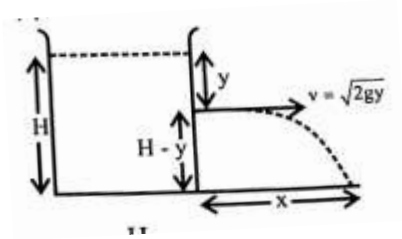
$$l_1 = \left[\frac{\mu}{1+\mu}\right] l$$

37. 2) For an ideal gas

PV = Constant [at constant temperature]

PV does not vary with V

38. 1)



At $y = \frac{H}{2}$ maximum range is obtained

Which is equal to H

$R_h = R_{H-h}$ velocity of efflux = Velocity of efflux = $\sqrt{2gy}$

$H - y = \frac{1}{2}gT^2 \quad uy = 0$ for horizontal motion

$T = \sqrt{\frac{2(H-y)}{g}}$

Range = x = $\sqrt{\frac{2gy \times 2(H-y)}{g}} = 2\sqrt{(H-y)y}$

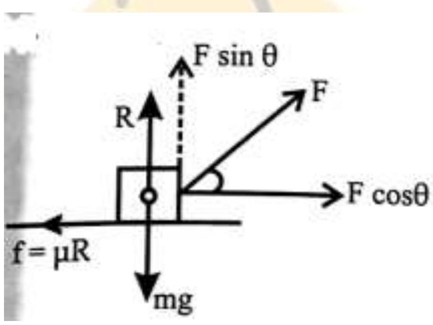
For x to be maximum $\frac{dx}{dy} = 0$

We get y = $\frac{H}{2}$

Range is equal for $\rightarrow$ $y = \frac{H}{2}$ or

H – y $\Rightarrow$ H - $\frac{H}{2} = \frac{H}{2}$

39. 4)



F + F sin θ = mg

R = mg – F sin θ

Force of friction (f_r) = μR = μ [mg – F sin θ]

Block will move

F cos θ $\geq$ fr

$F\cos\theta \ge \mu(mg - F\sin\theta)$

$F \ge \dfrac{\mu mg}{\cos\theta + \mu\sin\theta}$ ..... (1)

F will minimum when cos θ + μ sin θ = max

$\dfrac{d}{d\theta}[\cos\theta + \mu\sin\theta] = 0 \Rightarrow \mu = \tan\theta$

$\cos\theta = \dfrac{1}{\sqrt{1+\mu^2}} \sin\theta = \dfrac{\mu}{\sqrt{1+\mu^2}}$

This value put in (1) we get $F_{min} = \dfrac{\mu mg}{\sqrt{1+\mu^2}}$

40. 3) $\sin\ \theta\ =\ \dfrac{h}{s}$

$h = s\ \sin\theta_1$

$s_1 \sin\theta_1\ = s_2 \sin\theta_2$

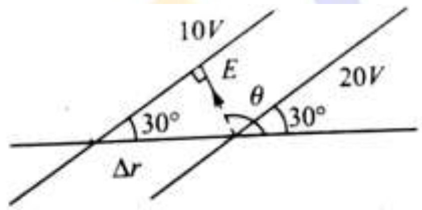
$\dfrac{1}{2}a_1t_1^2\ \sin\theta_2\ = \dfrac{1}{2}a_2t_2^2\ \sin\ \theta_2$

$g\sin\theta_1 t_1^2\ \sin\theta_1 = g\sin\theta_2 t_2^2\ \sin\theta$

$t_1^2 \sin^2\theta_1\ = t_2^2\ \sin^2\theta_2$

$\dfrac{t_1}{t_2} = \dfrac{\sin\theta_2}{\sin\theta_1}$

41. 3)



Using $dV = \vec{E}.d\vec{r}$

$\Rightarrow \Delta V = -E.\Delta r\cos\theta$

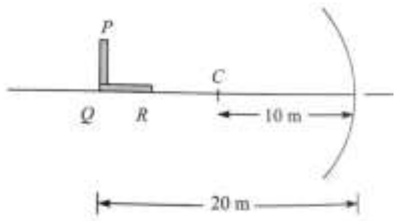
$\Rightarrow E = \dfrac{-\Delta V}{\Delta r\cos\theta}$

$\Rightarrow E = \dfrac{-(20-10)}{10\times10^{-2}\cos 120^0}$

$= \dfrac{-10}{10\times10^{-2}\left(-\sin 30^0\right)} = \dfrac{-10^2}{-1/2} = 200V/m$

Direction of E be perpendicular to equipotential surface i.e at 120^0 with x - axis

42. 2) Focal length of mirror $f = \frac{R}{2} = \frac{10}{2} = 5\text{cm}$



For part PQ transverse magnification

Length of image $L_1 = \left(\frac{f}{f-u}\right) \times L_0$

$= \left(\frac{-5}{-5-(-20)}\right) \times L_0 = \frac{-L_0}{3}$

For part QR : longitudinal magnification

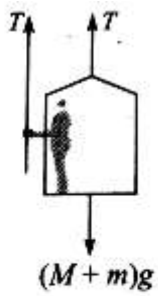
Length of image $L_2 = \left(\frac{f}{f-u}\right)^2 L_0$

$= \left(\frac{-5}{-5-(-20)}\right)^2 \times L_0 = \frac{L_0}{9} \Rightarrow \frac{L_1}{L_2} = \frac{3}{1}$

43. 2) Considering free body diagram of man and crate system in vertical direction

2T = (M + m) g

$\therefore T = \left(\frac{M+m}{2}\right) g$



44. 3) Law of conservation of charge

$Q_1 + Q_2 = Q$

$C_1V_1 + C_2V_2 = (C_1 + C_2) V_{common}$

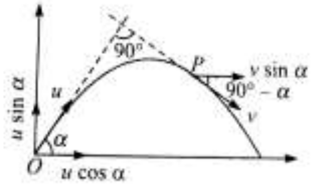
$20 \times 500 + 10 \times 200 = (20 + 10) V_c$

$30 V_c = 12000$

$V_c = 400$ V

45. 2) Horizontal velocity at point ‘O = u cos α

Horizontal velocity at point



P = v sin α

In projectile motion horizontal component of velocity remains constant throughout the motion

46. (3) Let's assume ratio of ^{35}Cl and ^{37}Cl is x : y

$\therefore \frac{x \times 35 + y \times 37}{x+y} = 35.5$

$\therefore 35x + 37y = 35.5x + 35.5y$

$\therefore 1.5y = 0.5x$

$\therefore \frac{x}{y} = \frac{3}{1}$

47. (1) One mole of urea (H_2NCONH_2) on strong heating produces 2 moles of NH_3.

$n_{urea} = \frac{0.6}{60}$ = 0.01 mole

$\therefore n_{NH_3}$ = 2 x 0.01 = 0.02 mole

$NH_3 + HCl \longrightarrow NH_4Cl$

$\therefore n_{HCl}$ = 0.02 mole

$\therefore$ MV = 0.02 mole

0.2 x 0. 1 = 0.02 mole

48. (2) No. of radial nodes of 2s = n – *l* – 1 = 2 – 0 – 1 = 1

Value of $\psi^2(r)$ is always positive.

49. (3)

50. (3) Across the period first reactivity decreases and then increases upto group 17.

51. (1) A. Be $\rightarrow$ Fully filled $2s^2$ configuration.

B. N $\rightarrow$ Half filled $2p^3$ configuration.

C. 2^{nd} $\Delta_{eg}H$ is positive for all the elements.

52. (2) i) $NH_3 \rightarrow 3\sigma bp + 1 lp$

ii) $SiO_2 \rightarrow 4\sigma bp + 0 lp$ (Network solid)

iii) $H_2O \rightarrow 2\sigma bp + 2 lp$ (Network solid)

iv) $CH_4 \rightarrow 4\sigma bp$

53. (2) B) Intramolecular hydrogen bonding is present in o-nitrophenol.

C) Intermolecular hydrogen bonding is present in HF.

54. (1) $IE_2 >> IE_1 \Rightarrow$ Only one valence e^-

$\therefore$ It is alkali metal.

$\therefore$ Metal hydroxide = MOH

55. (1) When ΔG becomes positive, formation of M_2O_n becomes non-spontaneous

$\therefore M_2O_n$ becomes unstable.

56. (1) Large K_{eq} indicates that at equilibrium large amount of products is present. But that does not mean reaction is fast.

57. (1) Concentrations after mixing

$[Pb^{2+}] = \frac{300 \times 0.134}{400} = 0.1005$ M

$\therefore [Cl^-] = \frac{100 \times 0.4}{400} = 0.1$ M

$\therefore Q_{sp} = [Pb^{2+}] [Cl^-]^2$

$= 0.1005 \times 0.1^2 \approx 10^{-3} > K_{sp}$

58. (2)

59. (3)

60. (4) $Fe^{2+} \longrightarrow Fe^{3+}$ (n-factor = 1)

$Cr_2O_7^{2-} \longrightarrow 2Cr^{3+}$ (n-factor = 6)

m_{eq} of Fe^{2+} = m_{eq} of $Cr_2O_7^{2-}$

M x 15 x 1 = 0.03 x 20 x 6

$\therefore$ M x 15 x 1 = 0.03 x 20 x 6

$\therefore$ M = 0.24 M

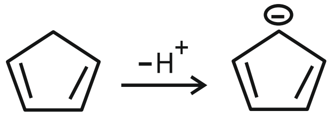
61. (1) Kjeldahl method cannot be used for :

i) Nitro compounds

ii) Azo compounds.

iii) N is part of the ring.

62. (4)



Aromatic

63. (2) EDG are activating and EWG are deactivating for ArSE.

64. (4) $H_3C-CH=CH_2 \xrightarrow{H^+/H_2O} H_3C-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{KIO\,(\text{Iodoform reaction})} CH_3-\overset{\overset{O}{||}}{C}-O^-K^+ + CHI_3$

65. (1) For isotonic solutions, $i_1C_1 = i_2C_2$

(A) 2 x 1 = 1 x 2

(B) 3 x 1 = 2 x 1.5

(C) 4 x 1.5 = 3 x 2

(D) 2 x 2.5 = 5 x 1

66. (2) $K_2HgI_4 \rightleftharpoons 2K^+ + HgI_4^{2-}$

$1-0.4 \qquad 0.8 \qquad 0.4$

$i = 1-0.4+0.8+0.4 = 1.8$

67. (1) Henry's law : $p = K_H\,x$

$\therefore$ At a given pressure, $K_H \propto \frac{1}{x}$

$\therefore$ As K_H increases, solubility (x) decreases.

68. (1) Size of aqueous ion: $Na^+(aq) > K^+(aq)$

$\therefore$ Ionic mobility: $K^+(aq) > Na^+(aq)$

$\therefore$ Order of conductivity: $K^+(aq) > Na^+(aq)$

69. (3) $Fe^{2+}(aq)|Fe^{3+}(aq)||Ag^+(aq)|Ag(s)$

$\therefore E^0_{cell} = E^0_{Ag^+/Ag} - E^0_{Fe^{3+}/Fe^{2+}}$

$Fe^{2+} + 2e^- \rightarrow Fe \quad \Delta G^0_1 = -2F\,x\,y$

$Fe^{3+} + 3e^- \rightarrow Fe \quad \Delta G^0_2 = -3F\,x\,z$

$\therefore Fe^{3+} + e^- \rightarrow Fe^{2+} \quad \Delta G^0_3 = -1F\,x\,E^0$

$\Delta G^0_3 = \Delta G^0_2 - \Delta G^0_1$

$-F \times E^0 = -3Fz + 2Fy$

$\therefore E^0_{cell} = x-(3z-2y) = x + 2y - 3z$

70. (3) $kt = 2.303 \log \frac{A_0}{A_t}$

$t_{1/2} = \frac{0.693}{k} \Rightarrow k = \frac{0.693}{6.93} = \frac{1}{10}$

$\therefore$ t = 10 x 2.303 log $\frac{100}{10}$ = 23.03 years

71. (1) $k = Ae^{-E_a/RT}$

$k' = Ae^{-E_a'/RT}$

$\frac{k'}{k} = e^{-(E_a' - E_a)/RT}$

$10^6 = e^{-\Delta E_a/RT}$

$\ln 10^6 = \frac{-\Delta E_a}{RT}$

$2.303 \log 10^6 = \frac{-\Delta E_a}{RT}$

$\therefore \Delta E_a = -2.303\ RT \times 6$

72. (2)

73. (1)

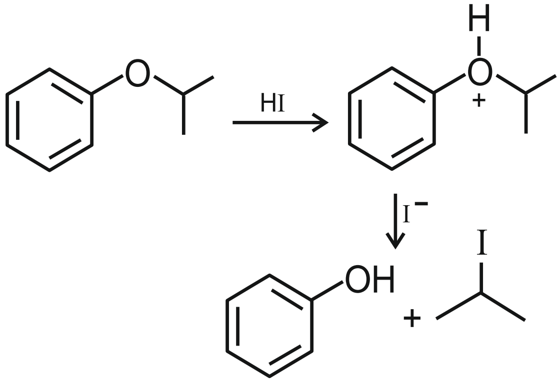
74. (4) cis – $[PtCl_2(en)_2]^{2+}$ exhibits optical isomerism.
$\therefore$ There are two enantiomers.

75. (4) H_2O acts as a weak field ligand.

76. (4) CO is a strong field ligand
Cl^- is a weak field ligand.

77. (1) KCN is highly ionic but AgCN is covalent compound.

78. (4)

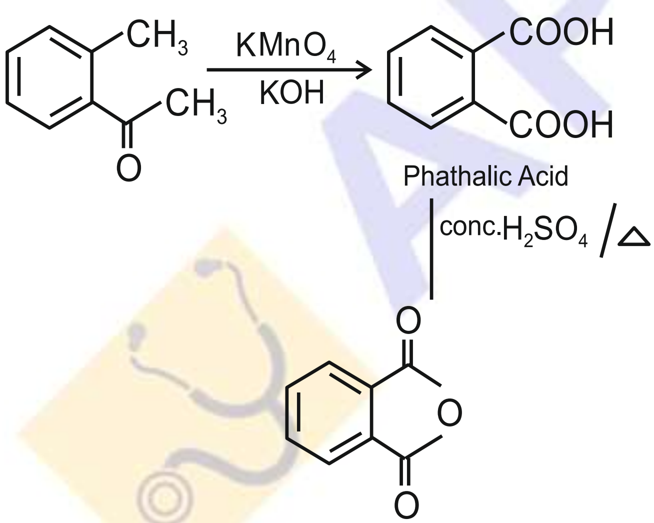


79. (3) $CH_3CH_2OH \xrightarrow{\text{conc.}H_2SO_4} H_2C = CH_2\,(g) \xrightarrow[273K]{KMnO_4(aq)} \underset{OH}{\underset{|}{CH_2}} - \underset{OH}{\underset{|}{CH_2}}$

Glycol

80. (3)

81. (4)

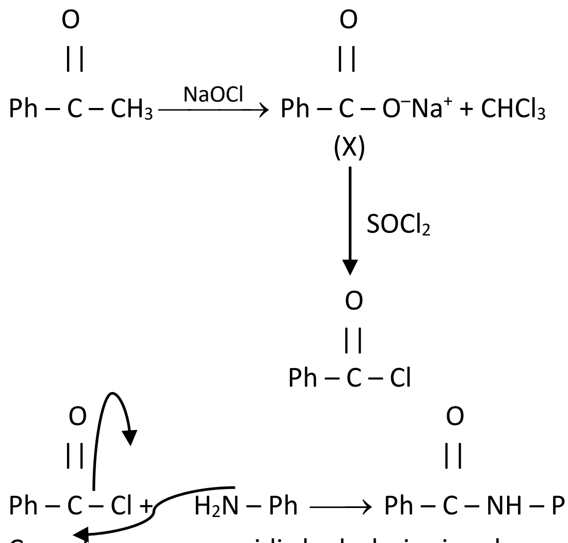


Phathalic Unhydride

(used in preparation of phenolphthalein)

82. (2) Alkaline hydrolysis of ester takes place by nucleophilic addition of OH^-.
$\therefore$ As electrophilicity of ester increares, ease of hydrolysis increases.
EDG decreases electrophilicity and EWG increases electrophilicity.

83. (1)



84. (4) Cyanobenzene on acidic hydrolysis gives benzoic acid.

85. (2)

86. (1) Glycogen is a branched polymer like amylopectin.

87. (1) A-iii; B-i; C-ii; D-iv

88. (3)

89. (3) D) Stability of +5 (higher O.S.) decreases down the group due to Inert pair effect.

E) Maximum covalency of N=4 because it belongs to second period.

90. (1) Sulphur can form $p\pi - p\pi$ bonds .

e.g. $CS_2 \rightarrow S = C = S$