MP Murlidhar Mohol & APMA initiative

Mission NEET 2025

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

DATE : 19.04.2025

PCB : ENTIRE XI + XII NCERT

Note:

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

1. (1) It is another form of law of conservation of energy

2. (4) $P = \frac{a^3b^2}{cd}, \frac{\Delta P}{P} \times 100\% = 3\frac{\Delta a}{a} \times 100\% + 2\frac{\Delta b}{b} \times 100\% + \frac{\Delta c}{c} \times 100\% + \frac{\Delta d}{d} \times 100\%$

$= 3 \times 1\% + 2 \times 2\% + 3\% + 4\% = 14\%$

3. (3) Change in momentum

$\Delta P = \int F dt \;\; \Delta P = \int_0^3 \left(3t^2 + 6t\right) dt = 54,$

$P - 0 = 54, P = 54$

$\Delta K = \frac{P^2}{2m} = \frac{54 \times 54}{2 \times 18} = 81 J$

4. (1) From the figure, we see that x_0 = –2.0 m, we can apply

$x - x_0 = v_0 t + \frac{1}{2} a t^2$

with t = 1.0 s, and then again with t = 2.0 s. This yields two equations for the two unknowns, v0 and a:

$0.0 - (-2.0m) = v_0 (1.0s) + \frac{1}{2} a (1.0s)^2$

$6.0m - (-2.0m) = v_0 (2.0s) + \frac{1}{2} a (2.0s)^2$

Solving these simultaneous equations yields the results v_0 = 0 and a = 4.0 m/s^2.The fact that the answer is positive tells us that the acceleration vector points in the +x direction.

5. (4) As V(t) = 220 sin 100πt

So, I(t) = $\frac{220}{50}$ sin100πt

i.e., I = I_m = sin (100πt)

For I = I_m

$t_1 = \frac{\pi}{2} \times \frac{1}{100\pi} = \frac{1}{200}$ sec and for $I = \frac{I_m}{2}$ $\frac{I_m}{2} = I_m \sin(100\pi t_2) \Rightarrow \frac{\pi}{6} = 100 \Rightarrow t_2 = \frac{1}{600}s$

$\therefore t_{eq} = \frac{1}{200} - \frac{1}{600} = \frac{2}{600} = \frac{1}{300}s = 3.3\,ms$

6. (4) For spring mass system

$$\frac{1}{K_{eq}} = \frac{1}{3K} + \frac{1}{2K} = \frac{5}{6K};\ K_{eq} = \frac{6K}{5}$$

$$f = \frac{1}{2\pi}\sqrt{\frac{K_{eq}}{m}} = \frac{1}{2\pi}\sqrt{\frac{6K}{5m}}$$

7. (3) up $a_1 = g + \frac{F}{m}$, down $a_2 = g - \frac{F}{m}$

If 'h' is the maximum height $h = \frac{1}{2}at^2$

8. (3) THEORY

9. (1) $R_{\max} = 250m$ at $\theta = 30^o$

$$\Rightarrow \frac{u^2 \sin(2\times 45^o)}{g} = 250m,\ R = \frac{u^2 \sin 2\theta}{g}$$

$$\Rightarrow \frac{u^2}{10} = 250m = \frac{2500 \times \sin 60^o}{10}$$

$$\Rightarrow u = 50m/s,\ R = 125\sqrt{3}\,m$$

10. (3) $B = \frac{\mu_0 I}{2r}$ here I=ne; $B = \frac{\mu_0 ne}{2r}$

11. (3) $T = M \times B$; $T = MB\sin\theta$

θ us an angle between $\bar{M}$ & $\bar{B}$

Hence here θ is $90 - \theta$

12. (2) N = 2(10 + 3) = 26 newton

$f_{s_{max}}$ = 0.5 × 26 = 13 N

∴ The force that will try to move it is

(4 × 2) = 8 N

∴ It will not slip so, f = 8

13. (2) Mutual inductance $M = \frac{\phi_N}{I_m} = \frac{\phi_M}{I_N}$

$$\Rightarrow \phi_M = \left(\frac{I_N}{I_M}\right)\phi_N = \frac{3}{2}\times 1.8\times 10^{-3} = 2.7\times 10^{-3} Wb$$

14. (2) $\vec{X} \,||\, \vec{E}$ and $\vec{k} \,||\, \vec{E}\times\vec{B}$

15. (1) $\frac{\Delta\lambda}{\lambda} = \frac{\lambda+\Delta\lambda}{65}$ --------(i)

$$\frac{\Delta\lambda}{\lambda(\lambda+\Delta\lambda)} = \frac{(\lambda+\Delta\lambda)-\lambda}{\lambda(\lambda+\Delta\lambda)} = \frac{1}{\lambda} - \frac{1}{\lambda+\Delta\lambda} = \frac{1}{65}$$

$$f_1 - f_2 = 5$$

$\frac{v}{\lambda} - \frac{v}{\lambda+\Delta\lambda} = 5$ ------(ii)

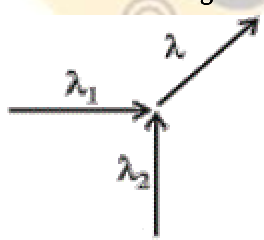
From (i) and (ii)

$$\frac{5}{v} = \frac{1}{65} \Rightarrow v = 325 m/s$$

16. (4) $4\left(\frac{V_0}{2l_0}\right) = 7\left(\frac{V_0}{4l_c}\right)$; $\frac{2V_0}{l_0} = \frac{7V_0}{4l_c} \Rightarrow \frac{l_0}{l_c} = \frac{8}{7}$

17. (1) a and b have same frequency due to same stopping potential and a and b have different intensities due to different current

18. (1) From the de Broglie relation,



$$p_1 = \frac{h}{\lambda_1}, p_2 = \frac{h}{\lambda_{22}}$$

Momentum of the final particle (pf) is given by

$$\therefore p_f = \sqrt{p_1^2 + p_2^2} \Rightarrow \frac{h}{\lambda} = \sqrt{\frac{h^2}{\lambda_1^2} + \frac{h^2}{\lambda_2^2}}$$

$$\Rightarrow \frac{1}{\lambda^2} = \frac{1}{\lambda_1^2} + \frac{1}{\lambda^2}$$

19. (4) As an electron makes a transition from an exited state to the ground state Kinetic energy increases but potential energy and total energy decrease

20. (3) Columbic repulsive force exists between protons

21. (1) $P = F \cdot V$

$$P = mv.\frac{dv}{dt}$$

$$Pdt = mvdv$$

$$\int Pdt = \int mvdv$$

$$Pt = \frac{mv^2}{2}$$

$$v^2 \propto t$$

In terms of position

P = F. V = mav

$$P = mv.\frac{dv}{dx}v$$

$$\int Pdx = \int mv^2 dv$$

$$Px = \frac{mv^3}{3}$$

$$\therefore v^3 = \frac{3Px}{m}$$

KE= $\frac{1}{2}mv^2 = \frac{1}{2}m\left[\left(\frac{3Px}{m}\right)^{\frac{1}{3}}\right]^2 = \frac{1}{2}m\left(\frac{3P}{m}\right)^{\frac{2}{3}} \times x^{\frac{2}{3}}$

$$\therefore KE \propto x^{\frac{2}{3}}$$

22. (1) $\mathrm{Y} = \overline{\overline{\mathrm{A}}.\overline{\mathrm{B}}} + \overline{\overline{\mathrm{A}}} + \overline{\overline{\mathrm{B}}} = \mathrm{A} + \mathrm{B}$ is OR gate and

$$\mathrm{Y} = \overline{\overline{(\mathrm{A.B})}.\overline{\mathrm{A.B}}} = \overline{\overline{\mathrm{A.B}}} + \overline{\overline{\mathrm{A.B}}} = \mathrm{AB}$$

Hence, this circuit functions as an AND gate.

23. (1) THEORY

24. (2) THEORY

25. (3) $\Delta P \propto \frac{1}{r}$

Pressure inside a bubble $= P_0 + \frac{4S}{R}$

When they are connected using a tube then, as smaller bubbles {due to small radius} has higher pressure, the air flows from smaller bubble to bigger bubble until the smaller bubble vanishes completely.

26. (2) Q = $\Delta U = U_f - U_i$ = [internal energy of 4 moles of a monoatomic gas + internal energy of 2 moles of a diatomic gas] – [internal energy of4 moles of a diatomic gas]

$= (4\times\frac{3}{2}RT + 2\times\frac{5}{2}RT) - (4\times\frac{5}{2}RT)$

= (6RT + 5RT) – (10 RT) = RT

27. (2) $\lambda_1 T_1 = \lambda_2 T_2 \Rightarrow \frac{T_1}{T_2} = \frac{\lambda_2}{\lambda_1}$; $P \propto r^2 T^4$

$$\frac{P_1}{P_2} = \left(\frac{r_1}{r_2}\right)^2 \left(\frac{T_1}{T_2}\right)^4 = \left(\frac{r_1}{r_2}\right)^2 \left(\frac{\lambda_2}{\lambda_1}\right)^4$$

$$\left(\frac{6}{18}\right)^2 \left(\frac{1500}{500}\right)^4 = \left(\frac{1}{3}\right)^2 \left(\frac{3}{1}\right)^4 = 3^2 = 9$$

28. (3) $V = \sqrt{\frac{3RT}{M}}$; $V \propto \sqrt{\frac{T}{M}}$

$T \rightarrow 2T$; $M \rightarrow M/2$

$$\frac{V}{V^{|}} = \sqrt{\frac{T}{2T}\frac{16}{32}} = \frac{1}{2} ; \therefore V^{|} = 2V$$

29. (3) ΔL α length, ΔA α area the vertical dimension of plate 4 increases the most and the area of plate 3 increases the most

30. (3) $I_z = I_x + I_y$; $I_z = 2I_x$

$I_x = I_{z/2} = \frac{mr^2}{4} = mk^2$

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

31. (1) Present angular momentum of earth $L_1 = I\omega = \frac{2}{5}MR^2\omega$

New angular momentum because of change in radius $L_2 = \frac{2}{5}M\left(\frac{R}{2}\right)^2 \omega'$

if external torque is zero then angular momentum must be conserved

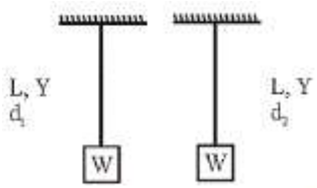
$L_1 = L_2 \Rightarrow \frac{2}{5}MR^2\omega = \frac{1}{4}\times\frac{2}{5}MR^2\omega'$ i.e., $\omega' = 4\omega$

$T' = \frac{1}{4}T = \frac{1}{4}\times 24 = 6h$

32. (3) Taking the position of *m* as origin and the line joining the *m* and *M* as the x axis we get the position of *m* as $X_1 = 0$ and the position of the *M* will be $x_2 = L$

So the position of the center of mass will be $x = \frac{m\times 0 + M\times L}{m+M} = L\left(\frac{M}{m+M}\right)$

33. (4)



$\frac{\text{Energy stored}}{\text{Volume}} = \frac{1}{2}\frac{(\text{Stress})^2}{\text{Y}}$

$\frac{u_1}{u_2} = \frac{1}{2} \Rightarrow 4u_1 = u_2$

$4\frac{1}{2Y}\left[\frac{W.4}{\pi d_1^2}\right] = \frac{1}{2Y}\left[\frac{W.4}{\pi d_2^2}\right]^2$

$4 = \left(\frac{d_1}{d_2}\right)^4 \Rightarrow \frac{d_1}{d_2} = \sqrt{2}:1$

34. (4) As r_2 less than r_1 so $K_2 > K_1$

As angular momentum is conserved so $L_2 = L_1$

35. (1) $I = \frac{n\varepsilon}{R + nr}$

Here R = 0

Then $I = \frac{\varepsilon}{r}$

P.D V=ε−Ir

$$= \varepsilon - \left(\frac{\varepsilon}{r}\right) r = 0$$

36. (1) $\frac{2}{x} = \frac{\ell}{100-\ell}, \frac{x}{2} = \frac{\ell+20}{80-\ell}$

on solving we get x = 3Ω

37. (2) $d = 10^{-3} m,\ D = 1m,\ \lambda = 500 \times 10^{-9} m$

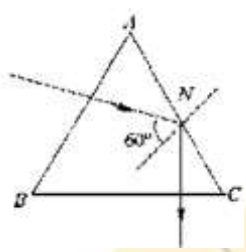
The width of central maxima in a single slit diffraction: $\frac{2\lambda D}{a}$

Fringe width in double slit pattern: $\beta = \frac{\lambda D}{d}$

$$10\beta = \frac{2\lambda D}{a} \Rightarrow 10\frac{\lambda D}{d} = \frac{2\lambda D}{a}$$

$$\Rightarrow a = \frac{d}{5} mm = 0.2mm$$

38. (2)



At point N ray will go through total internal reflection.

$\Delta = 180 - 2(60) = 60^0$

39. (1) Given: $f_0 = 1.2$ cm ; $f_e = 3.0$ cm

$u_0 = 1.25$ cm ; M_∞= ?

From $\frac{1}{f_0} = \frac{1}{v_0} - \frac{1}{u_0}$

$$\frac{1}{1.2} = \frac{1}{v_0} - \frac{1}{(-1.25)} \qquad \Rightarrow \frac{1}{v_0} = \frac{1}{1.2} - \frac{1}{1.25} \Rightarrow v = 30cm$$

Magnification at infinity,

$$M_\infty = -\frac{v_0}{u_0} \times \frac{D}{f_e} = \frac{30}{1.25} \times \frac{25}{3} = 200$$

40. (2) A charge q is placed at the centre C of the line joining two equal charges Q each, at points A and B. Let AB=2a

If the net force on each charge will be zero, the system will be in equilibrium.

Let us consider the charge Q at A. Under equilibrium, the total force on this charge is

$$\frac{1}{4\pi\varepsilon_0}\frac{qQ}{a^2}+\frac{1}{4\pi\varepsilon_0}\frac{QQ}{(a/2)^2}=0 \Rightarrow \frac{1}{4\pi\varepsilon_0}\frac{qQ}{a^2}=-\frac{1}{4\pi\varepsilon_0}\frac{4Q^2}{a^2}\Rightarrow q=-\frac{Q}{4}$$

41. (1) q_1= CE, $q_2 = CE\times\frac{3}{5}$

$$\frac{q_1}{q_2}=\frac{5CE}{3CE}=\frac{5}{3}$$

42. (3) The net magnetic field at the centre 'O' of the circular arc is

$$B_0=\frac{\mu_0 I}{4\pi R}+\frac{3\mu_0 I}{8R}-\frac{\mu_0 I}{8\pi R}=\frac{\mu_0 I}{8\pi R}+\frac{3\mu_0 I}{8R}$$

$$B_0=\frac{\mu_0 I}{8R}\left(\frac{1+3\pi}{\pi}\right)$$

43. (1) $S=\frac{G}{n-1};\ n=\frac{I}{I_g}$

$$n=\frac{100mA}{10mA}=10;\ \therefore 0.1=\frac{G}{9}\Rightarrow G=0.9\Omega$$

44. (1) $W=\bar{F}.\bar{S}=q\bar{E}.\bar{S}$

45. (3) Loss of KE = $\frac{1}{2}\left(\frac{m_1 m_2}{m_1+m_2}\right)u_{rel}^2\left(1-e^2\right)$

$$=\frac{1}{2}\times\frac{m}{2}\left(9v^2\right)\frac{3}{4}=\frac{27mv^2}{16}$$

46. (3) α and β - D - glucoses differ in the arrangement of groups around one carbon atom (C_1). i.e ., they differ in configuration. Hence, these are also known as anomers

47. (1) Except III, IV all options are correct.

The correct statement for III is,

Molecular electronic configuration is

$\sigma 1s^2\ \sigma^* 1s^2\ \sigma 2s^2\ \sigma^* 2s^2\ (\pi 2p_x)^2 = (\pi 2p_y)^2$

So, it is clear from above configuration that C_2 molecule has paired electrons both in π orbital and therefore it is diamagnetic in nature. The correct statement for IV is given in statement II.

48. (2) Riboflavin - Cheilosis, Fissuring at corners of mouth and lips
Thiamine - Beri - beri, loss of appetite, retarded growth
Pyridoxine - Convulsions
Ascorbic acid - Scurvy, bleeding gums

49. (3) CH_3 COOH has α hydrogen

50. (2) Standard enthalpy of formation, $\Delta_r H^0$ of element in its reference state is taken as zero

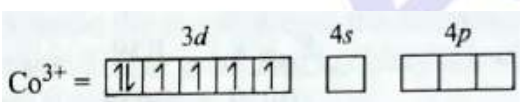
$\Delta_r H^0$ for KCl (s) = – 436.75 KJ mol^{-1}

51. (1) **CH_3 – CHOH –** CHOH – CH_3 is formed

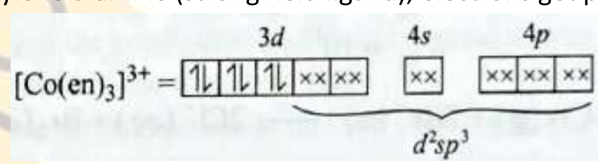
52. (4) **It contains** β–D(–) – deoxyribofuranose

53. (1) Among Ti, V, Cr and Mn generally second ionisation energy increases with increase in atomic number but second ionization energy of Cr ($3d^5\ 4s^1$) is greater than that of Mn because Cr attains exactly half-filled d-subshell after removal of one electron. Thus, the order of second ionisation enthalpy is Cr > Mn > V>Ti.

54. (4) $CH_3COONH_4^+$ is a salt of weak acid and weak base. PH of slat solution is independent of concentration of the salt solution.

55. (4) 

In presence of ethylene diamine (strong field ligand), electrons get paired.



$\therefore$ It is an inner orbital complex with no unpaired electrons.

56. (3) $\frac{1}{\lambda} = R_H\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

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

$\frac{1}{\lambda} = R_H\left(\frac{16-9}{144}\right) = \frac{7}{144} R_H$

57. (4) Fuel cell is used in spaceship and it is type of galvanic cell.

58. (4) Phenol is a highly activated compound which can undergo bromination directly with Bromine without any lewis acid.

59. (1)

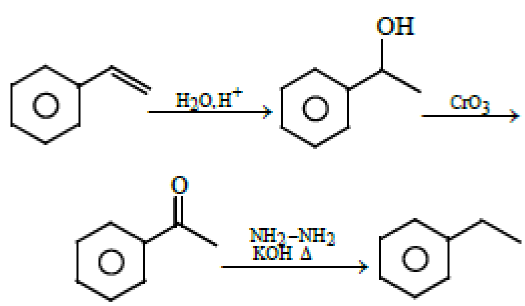
60. (3) 3 > 4 < 2 < 1

61. (3) Acetaldehyde (P) will not give Victor Meyer test,

$$HC \equiv CH \xrightarrow[Hg^{2+}]{H_2SO_4} \underset{CHOH}{\overset{CH_2}{||}} \xrightarrow{\text{Tauromerism}} \underset{CHO}{\overset{CH_3}{|}}$$

Ethyne Vinyl alcohol

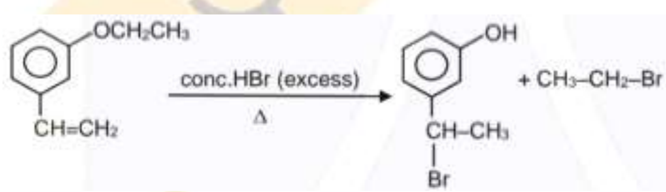
62. (1)



63. (1) Aniline is protonated to anilinium ion, which is meta directing. Hence significant amount of meta derivative (47%) is also formed

64. (1) C A D B

65. (4)



66. (2) $\Delta H = \Delta U + P\Delta V$

$\Delta H = \Delta U + \Delta n_g RT$ A

$- a \text{ J/mol} = \Delta U + \frac{1}{2} \times 8.314 \times T \ [\Delta n_g = 1 - \frac{1}{2} = \frac{1}{2}]$

$- a - \left(\frac{1}{2} \times 8.314 \times T\right) = \Delta U$

$\Delta U = -(a + 4.157\ T)$ J/mol

67. (3) The ions Ti^{2+}, V^{2+} and Cr^{2+} are strong reducing agents and will liberate hydrogen from a dilute acid, eg.

$$2Cr^{+2}\,(aq) + 2H^{+}\,(aq) \longrightarrow 2Cr^{+3}\,(aq) + H_2\,(g)$$

68. (4) (A) is hydroboration - oxidation. Anti marknovnikov's addition of water
(B) is acidic medium. Markownikov's addition of water

69. (3) $$4FeCr_2O_4 + 8Na_2CO_3 + 7O_2 \rightarrow \underset{A}{8Na_2CrO_4} + \underset{B}{2Fe_2O_3} + 8CO_2$$

Spin only magnetic moment

For Na_2CrO_4 $\mu_B = 0$

For Fe_2O_3 $\mu_B = 5.9$

sum = 5.9

70. (3)

Configuration	Element	Electronegativity
$1s^2, 2s^2, 2p^5$	Fluorine (F)	3.98
$1s^2, 2s^2, 2p^4$	Oxygen (O)	3.44
$1s^2, 2s^2, 2p^3$	Nitrogen (N)	3.04
$1s^2, 2s^2, 2p^6, 3s^2, 3p^4$	Sulphur (S)	2.58

On moving down the group, atomic size increases and electronegativity decreases. While in period, electronegativity increases.

So, order will be F > O > N>S.

Hence, the correct match is A-(iii), B-(iv), C-(i), D-(ii).

71. (1) Fe^{+3} will give green coloured bead when heated at point B.

Number of unpaired e^- in Fe^{+3} = 5

$\mu = 5.92$

Nearest integer = 6

72. (3) As per the definition of oxidation and reduction. Oxidation involves loss of electrons while reduction involves gain of electrons.

The overall reaction in which oxidation and reduction occur simultaneously is called redox reaction.

Thus, both (A) and (R) are true but (R) is not the correct explanation for (A).

73. (3) Theory based question

74 (1) Chlorophylls are green pigments in plants and contain magnesium.

They are useful during photosynthesis to store energy in the form of glucose from carbon dioxide and water in presence of sunlight.

75. (1) $C_2H_4 (g) + H_2 (g) \rightarrow C_2H_6 (g)$

$\Delta H = BE(C = C) + 4BE (C – H) + BE (H – H) – BE(C – C) – 6BE (C – H)$

$\Delta H = BE(C = C) + BE(H – H) - BE(C – C) – 2BE(C – H)$

$= 615 + 435 – 347 – 2 \times 414$

$= – 125$ kJ

76. (4) $K = \frac{1}{R}.\frac{l}{A}$

$0.008 = \frac{1}{80}.\frac{l}{A}$

$\frac{l}{A} = 0.64\ cm^{-1}$

77. (4) $t = \frac{2.303}{k}\log\frac{a}{a-x}$

$t = \frac{2.303}{1.8424\times10^{-4}}\log\frac{100}{80}$

$t = 1.25 \times 10^4[\log10 – 3loag\ 2]$

$t = 1.25 \times 10^4[1 – 0.92] = 1250$ s

78. (4) Be and Al form amphoteric oxides, BeO and Al_2O_3 respectively. These oxides can behave both as base as well as acids.

Aluminium is a lightweight silvery-white metal and beryllium is also a steel-grey metal which is quite brittle at room temperature and resembles some of the properties of aluminium.

Hence, Statement I is true and Statement II is false.

79. (2) $2\pi r_n = n\lambda_d$

$2\pi a_0 \frac{n^2}{Z} = n\lambda_d$

$2\pi a_0 \frac{4^2}{Z} = n\lambda_d$

$\lambda_d = 8\pi a_0$

80. (3) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$

0.5 mole

2 moles of $KClO_3$, produced 3 moles of O_2.

0.5 mole of $KClO_3$, produced moles of CO_2 =

$\frac{3}{2} \times 0.5$ = 0.75 mole

$2Mg + O_2 \xrightarrow{\Delta} 2MgO$

0.75 mole

0.75 mole of O_2 will produce 1.5 mole of MgO

81. (2) According to M.O.T.

$O_2 \rightarrow$ no. of unpaired electrons = 2

$O_2^- \rightarrow$ no. of unpaired electron = 1

NO $\rightarrow$ no. of unpaired electron = 1

$CN^- \rightarrow$ no. of unpaired electron = 0

$O_2^{2-} \rightarrow$ no. of unpaired electron = 0

82. (2) Non availability of vacant d – orbitals

83. (3) Iodoform – Antiseptic

CCl_4 – Fire extinguisher

CFC – Refrigerants

DDT – Insecticide

84. (3)

85. (2) $K_p = K_c (RT)^{\Delta n_g}$

$K_p > K_c$ for $\Delta n_g > 0$

$PCl_5 (g) \rightleftharpoons PCl_3 (g) + Cl_2 (g)$

$\Delta n_g > 0$

86. (3) PH = 3, $[H^+]_1 = 10^{-3}$

PH = 4, $[H^+]_2 = 10^{-4}$

Equal volume mixed

$$\left[H^+\right]_f = \frac{10^{-3} \times V + 10^{-4} xV}{2V}$$

$$\left[H^+\right]_f = \frac{11 \times 10^{-4}}{2}$$

= 5.5×10^{-4} M

pH = – log[H^+] = – log (5.5×10^{-4})

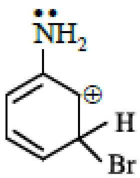
pH = 4 – log (5.5)

= 4 – 0.74
= 3.26

87. (3) $HPO_4^{2-} \xrightarrow{+H^+} H_2PO_4^-$
Base Conjugate acid

$H_2O \xrightarrow{-H^+} OH^-$
Acid Conjugate base

88. (3) Since – NH_2 group is o/p directing hence arenium ion will not be formed by attack at meta position i.e .,



89. (4) Unit of rate constant of zero order reaction is mol L^{-1} s^{-1},
All natural and artificial radioactive decay of unstable nuclei take place by first order kinetics.

90. (2) NaCl, 100% dissociation $\rightarrow$ i = 2
$CaCl_2$, 25% dissociation $\rightarrow$ i = 1.5
Na_3PO_4, 100% dissociation $\rightarrow$ i = 4
$AlCl_3$, 50% dissociation $\rightarrow$ i = 2.5