# Enthusiast, Leader & Achiever Course

## PHASE : ALL PHASE

## TARGET : PRE-MEDICAL 2020

Test Type : **MAJOR** Test Pattern : **NEET (UG)**

## TEST DATE : 04-08-2020

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

## HINT – SHEET

1. **Ans ( 4 )**

By palm rule, or by $\varepsilon = -\ell.(\vec{B} \times \vec{V})$

$e_{max} = B\ell v$ [when $B \perp v \perp \ell$]

$e_{min} = 0$ [$B \parallel v$ or $v \parallel \ell$ or $v \parallel B$]

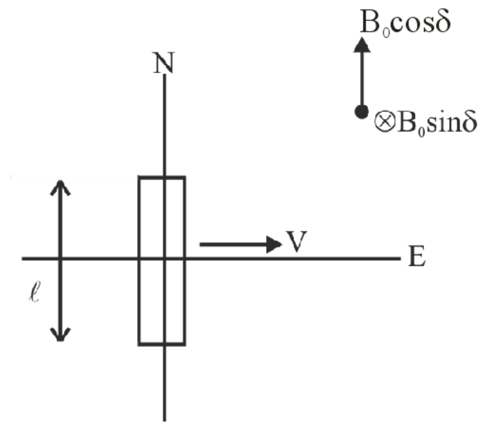
2. **Ans ( 4 )**

$|e| = \frac{d\phi}{dt} = 6t + 4$

at $t = 2$

$|e| = 16$ volt

3. **Ans ( 2 )**




length of conductor cuts magnetic field lines of $B_0 \sin\delta$

$\varepsilon = B\ell v$ [ when $B \perp \ell \perp v$]

$\varepsilon = B_0 \ell\ v \sin\delta$

4. **Ans ( 3 )**

The induced emf is

$e = -L\dfrac{di}{dt}$

Here, $di = (2 - 10)A = -8A$,

$\Rightarrow dt = 0.1s,\ e = 3.28$ V

$\therefore 3.28 = -\dfrac{L(-8)}{0.1}$

$\Rightarrow L = \dfrac{3.28 \times 0.1}{8} = 0.04H$

5. **Ans ( 3 )**

$e = -L\dfrac{di}{dt} = -L$ (Slope)

for t = 0 to t , $e = -L(-K) = +LK$

for time > t, $e = -L(+K) = -LK$

6. **Ans ( 1 )**

$P_p = 4000\ W = 100\ I_P,\ I_P = 40\ A$

$P_S = 0.8P_P = 3200\ W = 200\ I_S,\ I_S = 16\ A$

7. **Ans ( 2 )**

EMW propagating along + Z direction so

$\vec{E} \times \vec{B}$ would be along + Z direction and

$\vec{E} \perp \vec{B}$, option (2) saticefy both conditions.

8. **Ans ( 3 )**

$|e| = \dfrac{d\phi}{dt} = 4t$

$H = \int_0^3 \dfrac{e^2}{R} \cdot dt = \int_0^3 \dfrac{16t^2 dt}{4}$

$= 36$ J

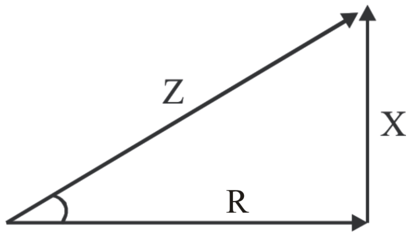
9. **Ans ( 2 )**

Given : $I = 5 + 10 \sin \omega t$,

$I_{eff} = \sqrt{5^2 + \dfrac{10^2}{2}} = 5\sqrt{3}$

10. **Ans ( 3 )**

Power factor $\cos\phi = \dfrac{R}{|Z|}$




$\cos\phi_1 = \dfrac{R}{\sqrt{R^2 + (3R)^2}} = \dfrac{1}{\sqrt{10}}$

$\cos\phi_2 = \dfrac{R}{\sqrt{R^2 + (3R - 2R)^2}} = \dfrac{1}{\sqrt{2}}$

So $\dfrac{\cos\phi_2}{\cos\phi_1} = \sqrt{5}$

11. **Ans ( 1 )**

Here $V_L = V_C$ so system is at resonance condition.

$V_R$ = Vsource = 100 V,

$I = \dfrac{V_R}{R} = \dfrac{100}{50} = 2A$

12. **Ans ( 2 )**

Power is maximum

when $X_L = X_C$

$\omega L = \dfrac{1}{\omega C}$

13. **Ans ( 1 )**

$\because$ total energy $= \dfrac{Q_0^2}{2C} = U_0,\ \dfrac{U_E}{U_B} = \dfrac{3}{1}$

$U_B = \dfrac{1}{4}U_0$

$\dfrac{1}{2}LI^2 = \dfrac{Q_0^2}{4(2C)}$

$\Rightarrow I = \dfrac{Q_0}{2\sqrt{LC}}$

14. **Ans ( 2 )**

The coil has inductance L besides the resistance R.

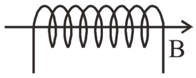
Hence for AC it's effective resistance $\sqrt{R^2 + X_L^2}$ will be larger than it's resistance R for D.C.

**15. Ans ( 3 )**

$$B_P = \frac{\mu_0 I\theta}{4\pi R}\left[1 - \frac{1}{2} + \frac{1}{3}\right]$$

**16. Ans ( 1 )**

$\therefore$ The total number of turns, N = 400 × 5 = 2000




and number of turns/length, $n = \frac{2000}{0.8} = 2500$

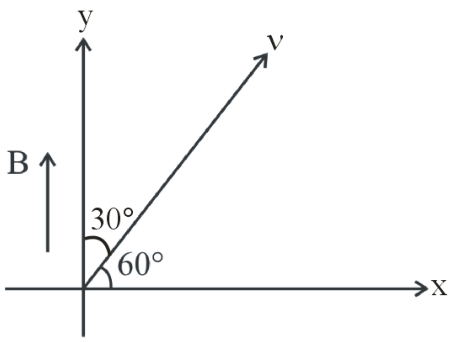
The magnitude of magnetic field inside the solenoid

$B = \mu_0 nI = 4 \times 3.14 \times 10^{-7} \times 2500 \times 8$

$= 2.5 \times 10^{-2}$ T

The direction of magnetic field is a along the axis of solenoid.

**17. Ans ( 3 )**




Path of proton will be helix

$$r = \frac{mv \sin 30^\circ}{qB}$$

$$r = \frac{1.67 \times 10^{-27} \times 2 \times 10^6 \times \frac{1}{2}}{1.6 \times 10^{-19} \times 0.104}$$

r = 0.1 m

$$T = \frac{2\pi m}{qB} = \frac{2\pi \times 1.67 \times 10^{-27}}{1.6 \times 10^{-19} \times 0.104}$$

$T = 2\pi \times 10^{-7}$ sec.

**18. Ans ( 3 )**

$$\vec{F}_L = \vec{F}_E + \vec{F}_M = \vec{O}$$

$$q\vec{E} + q(\vec{v} \times \vec{B}) = \vec{O}$$

$$\vec{E} = -(\vec{v} \times \vec{B})$$

$$= -(\vec{v}\hat{i} \times \vec{B}\hat{j})$$

$$\vec{E} = -vB\hat{k}$$

**19. Ans ( 1 )**

$$F_{CD} = I_C \ell_C B_D$$

$$F_{CD} = I_C\, \ell_C \frac{\mu_0 I_D}{2\pi d_{CD}} \text{ (Repulsion)}$$

$$F_{CG} = I_C \ell_C \frac{\mu_0 I_G}{2\pi d_{CG}} \text{ (Attraction)}$$

$$F_C = F_{CD} + F_{CD}$$

$$F_C = \frac{\mu_0 I_C \ell_C}{2\pi}\left(\frac{I_D}{d_{CD}} + \frac{I_G}{d_{CG}}\right)$$

$$F_C = 2 \times 10^{-7} \times 10 \times 0.25\left(\frac{30}{0.03} + \frac{20}{0.02}\right)$$

$$= 2 \times 10^{-6} \times 0.25 \times 2000$$

$$F_C = 10^{-3} \text{ N}$$

**20. Ans ( 3 )**

Factional decrease in magnetic field for near to centrer

$$\frac{\Delta B}{B} = \frac{3x^2}{2R^2}$$

$$\Rightarrow \frac{3x^2}{2R^2} = \frac{1}{100}$$

$$x = \frac{R}{\sqrt{150}}$$

**21. Ans ( 4 )**

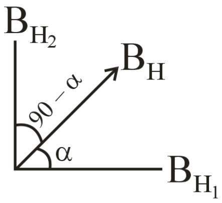
$$B_1 \propto \frac{2M}{x^3} \text{ and } B_2 \propto \frac{M}{y^3}$$

As $B_1 = B_2$

Hence $\frac{2M}{x^3} = \frac{M}{y^3}$ or $\frac{x^3}{y^3} = 2$ or $\frac{x}{y} = 2^{1/3}$

**22. Ans ( 1 )**

Vertical component remain same




$$\tan\phi = \frac{Bv}{B_H} \quad .......(1)$$

In plane 1 where dip angle is $\phi_1$

$$\tan\phi_1 = \frac{Bv}{B_{H_1}} = \frac{Bv}{B_H\cos\alpha}$$

$$\cos\alpha = \frac{\tan\phi}{\tan\phi_1} \quad .......(2)$$

In plane 2 where dip angle $\phi_2$

$$\tan\phi_2 = \frac{Bv}{B_{H_2}} = \frac{Bv}{B_H\cos(90-\alpha)} = \frac{Bv}{B_H\sin\alpha}$$

$$\tan\phi_2 = \frac{\tan\phi}{\sin\alpha} \Rightarrow \sin\alpha = \frac{\tan\phi}{\tan\phi_2} \quad ........(3)$$

by (2) and (3)

$\sin^2\alpha + \cos^2\alpha = 1$

$$\frac{\tan^2\phi}{\tan^2\phi_1} + \frac{\tan^2\phi}{\tan^2\phi_2} = 1$$

$\cot^2\phi_1 + \cot^2\phi_2 = \cot^2\phi$

**23. Ans ( 2 )**

As magnetic susceptibility $X_m \propto \frac{1}{T}$, therefore

$$\frac{X_2}{X_1} = \frac{T_1}{T_2} = \frac{X_2}{0.0060} = \frac{273-73}{273-173} = \frac{200}{100} = 2$$

$X_2 = 2 \times 0.0060 = 0.0120$

**24. Ans ( 3 )**

(1) EMF is potential

MMF is current

so $\frac{\text{EMF}}{\text{MMF}} = \text{Resistance}$

(2) $F = qE$, $F = qVB$

so $[E] = [VB]$

$[E/B] = [V]$

(3) Magnetic field at center of toroid is zero

(4) $\oint \vec{B}.\vec{d\ell} = \mu_0 \sum i$

Also applicable for infinite long symmetrical current distribution

**25. Ans ( 4 )**

$\phi = \vec{B}.\vec{A}$

$= \left(a\hat{i} + b\hat{j} + c\hat{k}\right)\cdot \ell^2\hat{k}$

$\phi = C\ell^2$ weber

**26. Ans ( 1 )**

$q = \frac{\Delta\phi}{R} \Rightarrow \Delta\phi = qR$

$= (\text{area under the curve})\ R$

$= \frac{4\times 0.1}{2} \times 5 = 1$ weber

**27. Ans ( 3 )**

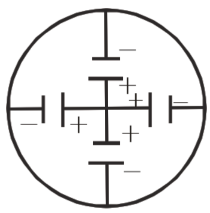
induced emf across the ends of each spoke is

$e = \frac{1}{2}Bl^2\omega$

Where l is the length of each spoke i.e., the radius of the wheel $\ell = 0.4$ m.

All the induced cells are connected in parallel as shown in the adjoining figure. Therefore induced emf between the rim and the centre of the wheel is

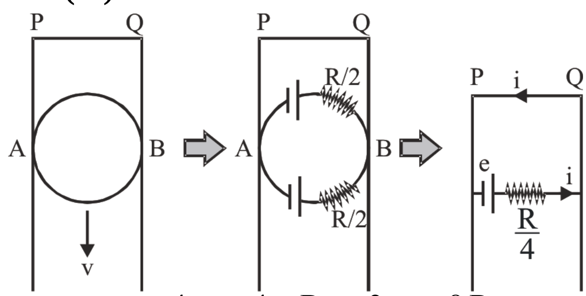
$e = \frac{1}{2}Bl^2\omega$



$$= \frac{1}{2} \times 0.4 \times 10^{-4} \times (0.4)^2 \times \frac{2\pi\times 180}{60}$$

$= 6 \times 10^{-5}$V

**28. Ans ( 4 )**




$$i = \frac{e}{R/4} = \frac{4e}{R} = \frac{4\cdot Bv\cdot 2r}{R} = \frac{8\,Bvr}{R}$$

**29. Ans ( 2 )**

For L,R circuit

$$\tau = \frac{L}{R} = \frac{5}{10} = \frac{1}{2}\text{sec}$$

$I = I_0(1-e^{-t/\tau})$

$I_\infty = I_0$

$I_1 = I_0(1-e^{-2})$

$$\frac{I_\infty}{I_1} = \frac{1}{1-e^{-2}} = \frac{e^2}{e^2-1}$$

**30. Ans ( 1 )**

$$\varepsilon_p = \left|\frac{d\phi}{dt}\right| = 4$$

$$\frac{\varepsilon_s}{\varepsilon_p} = \frac{N_s}{N_p} = \frac{1500}{50} = 30$$

$\varepsilon_s = 4 \times 30 = 120$

**31. Ans ( 2 )**

$$\vec{P} = \frac{1}{\mu_0}\left[\vec{E} \times \vec{B}\right], \vec{B} = \mu_0\vec{H}$$

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

**32. Ans ( 3 )**

$i = i_1\cos\omega t + i_2\sin\omega t$

$i^2 = (i_1^2\cos^2\omega t + I_2^2\sin^2\omega t + 2i_1i_2\sin\omega t\cos\omega t)$

$$\langle i^2\rangle = \left(\frac{i_1^2}{2} + \frac{i_2^2}{2} + i_1i_2\langle\sin 2\omega t\rangle\right)$$

$$\langle i^2\rangle = \left(\frac{i_1^2 + i_2^2}{2}\right)$$

$$\Rightarrow i_{rms} = \sqrt{\langle i^2\rangle} = \frac{(i_1^2 + i_2^2)^{\frac{1}{2}}}{\sqrt{2}}$$

**33. Ans ( 1 )**

$\because X_L << X_C$ ; hence bulb A glows brighter

For A $\Rightarrow I = \dfrac{V}{X_L}$ and

For B $\Rightarrow I = \dfrac{V}{X_C}$

**34. Ans ( 1 )**

$$Z_1 = \sqrt{R^2 + \frac{1}{(2\pi fC)^2}}$$

$$Z_2 = \sqrt{R^2 + \frac{1}{(2\pi(2f)C)^2}}$$

If $R << \dfrac{1}{2\pi fC}$, $\dfrac{Z_1}{Z_2} = 2$

If $R >> \dfrac{1}{2\pi fC}$, $\dfrac{Z_1}{Z_2} = 1$

so $1 < \dfrac{Z_1}{Z_2} < 2$

**35. Ans ( 3 )**

$V = 100\sin 100t$ Volt

$$I = 100\sin\left(100t + \frac{\pi}{3}\right)\text{mA}$$

Phase difference between V & I is $\dfrac{\pi}{3}$

$P = V_{rms}I_{rms}\cos\phi$

$$= \left(\frac{100}{\sqrt{2}}\right)\left(\frac{100}{\sqrt{2}} \times 10^{-3}\right)\cos\left(\frac{\pi}{3}\right) \text{ watt}$$

$P = 2.5$ watt

**36. Ans ( 1 )**

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

Here,

$X_L = 2\pi fL = 2\pi \times 500 \times 8.1 \times 10^{-3} = 25.4\Omega$

and $X_C = \dfrac{1}{2\pi fC}$

$$= \frac{1}{2 \times 3.14 \times 500 \times 12.5 \times 10^{-6}} = 25.5\Omega$$

$$\therefore Z = \sqrt{(10)^2 + (25.4 - 25.4)^2} = 10\Omega$$

$$\text{Now } i_{rms} = \frac{E_{rms}}{z} = \frac{100}{10} = 10A$$

$V_R = i_{rms} \times R = 10 \times 10 = 100$ V

**37. Ans ( 2 )**

Given that; $q = 100e$, $r = 0.8$m and $f = 1\text{ sec}^{-1}$

$$\therefore I = \frac{q}{t} = qf = 100e \times 1$$

$$\text{Now, } B = \frac{\mu_0 I}{2r} = \frac{\mu_0(100e \times 1)}{2 \times 0.8}$$

$$= \frac{\mu_0 \times 100 \times (1.6 \times 10^{-19})}{1.6} \times 1$$

$= 10^{-17}\mu_0.$

**38. Ans ( 1 )**

According to Ampere's circuital law

$$\oint \vec{B}\,.\,d\vec{l} = \mu_0 I_{\text{enclosed}} = \mu_0(2A - 1A) = \mu_0$$

**39. Ans ( 2 )**

$$r = \frac{mv}{qB} = \frac{\sqrt{2mqV}}{qB}$$

$$r \propto \sqrt{\frac{m}{q}},\ \frac{r_\alpha}{r_p} = \sqrt{\frac{4m}{2e}} \times \sqrt{\frac{e}{m}} = \sqrt{2}$$

$r_\alpha = r_p\sqrt{2}$, Here $r_2 > r_1$

So $r_1 = r_p$, $r_2 = r_\alpha = 5\sqrt{2}$

**40. Ans ( 1 )**

$$M = \frac{qL}{2m} = \frac{qI\,\omega}{2m}$$

$$= \frac{q\omega}{2m} \times \frac{m\ell^2}{3}\left(I = \frac{m\ell^2}{3}\right)$$

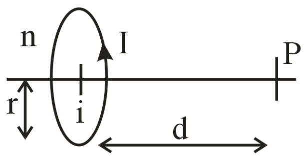
$$= \frac{q\,\omega\ell^2}{6}$$

**41. Ans ( 1 )**

The magnetic field at P due to the flat coil of n turns, radius r, carrying current I is

$$B = \frac{\mu_0}{2}\cdot\frac{nir^2}{(d^2+r^2)^{3/2}} \cong \frac{\mu_0}{2}\cdot\frac{nir^2}{d^3}(d >> r)$$

$$= \frac{\mu_0}{2\pi}\cdot\frac{n(\pi r^2)i}{d^3} = \frac{\mu_0}{2\pi}\cdot\frac{\mu}{d^3}$$




**42. Ans ( 1 )**

$\tau = NBiA$

$= 100 \times 0.2 \times 2 \times (0.08 \times 0.1)$

$= 0.32N \times m$

Direction can be found by Fleming's left hand rule.

**43. Ans ( 4 )**

$$B_{axis} = \frac{2\mu_0 M}{4\pi r_1^3},\ B_{eq} = \frac{\mu_0 M}{4\pi r_2^3}$$

$$\frac{B_{eq}}{B_{axis}} = \frac{r_1^3}{2r_2^3} = \frac{1}{2}\left(\frac{10\text{ cm}}{5\text{ cm}}\right)^3 = 4$$

$B_{eq} = 4\,B_{axis} = 4 \times 2 = 8$ T

**44. Ans ( 4 )**

$$T = 2\pi\sqrt{\frac{I}{MB_H}} \Rightarrow f \propto \sqrt{\frac{MB_H}{I}}$$

$$\frac{f_1}{f_2} = \sqrt{\frac{B_1\cos 30}{B_2\cos 60}} \Rightarrow \left(\frac{f_1}{f_2}\right)^2 = \frac{B_1}{B_2}\sqrt{3}$$

$$\Rightarrow \frac{B_1}{B_2} = \left(\frac{20}{15}\right)^2/\sqrt{3} = \frac{16}{9\sqrt{3}}$$

**46. Ans ( 3 )**

$$Na_2B_4O_7.10H_2O \xrightarrow{HOH} \underset{SB}{NaOH} + \underset{WA}{H_3BO_3}$$

**49. Ans ( 1 )**

$PbI_4$ not exists

**55. Ans ( 2 )**

$$H_2S + KMnO_4 \rightarrow MnO_2 + S + H_2O$$

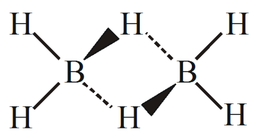
$\downarrow$

Colloidal sulphur

**56. Ans ( 3 )**

NCERT Part I (XII), Page no 197

**58. Ans ( 2 )**




Maximum no. of atoms in same plane = 6

No. of 3C - 4e$^-$ bonds = 2

Maximum no. of replacable H = 4

**60. Ans ( 2 )**

$$R\text{–}SiCl_3 \xrightarrow{HOH} R\text{–}Si(OH)_3$$

Polymerisation $\downarrow$

Cross-linked silicone

**63. Ans ( 4 )**

Valence e$^-$ of transition metal = (n – 1) d, xs

**70. Ans ( 2 )**

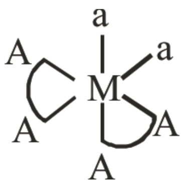
$+1(3) + x + 3(-2) = 0$

$x = +3$

C.N. = 6

**74. Ans ( 4 )**

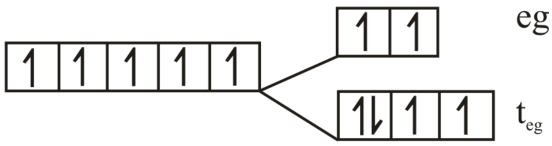
$M(AA)_2\ a_2$ shows G.I.




**75. Ans ( 3 )**

High spin $d^4$ complex $\rightarrow t_{2g}^3, e_g^1$

**78. Ans ( 2 )**




$\Delta_0 > P\ t_{2g}^4 eg^0$

**79. Ans ( 4 )**

$[Co(NH_3)_6]^{+3}$ $[Co(ONO)_6]^{-3}$

**83. Ans ( 4 )**

All are Tetrahedral

**85. Ans ( 3 )**

NCERT Pg. # 278,281, 285 ;

Para 9.4.1, 9.6.1, 9.7.2

**87. Ans ( 3 )**

Metal sulphide + $O_2 \rightarrow$ Metal oxide + $SO_2$

(air)

**89. Ans ( 2 )**

$KMnO_4$ is coloured due to charge-transfer.

**95. Ans ( 2 )**

NCERT (XII) Pg. # 108(E), 117(H)

**98. Ans ( 1 )**

NCERT (XII) Pg. # 107

**100. Ans ( 3 )**

NCERT (XII) Pg. # 101

**104. Ans ( 3 )**

NCERT XII Pg # 204(E), 222(H)

**105. Ans ( 4 )**

NCERT XII Pg # 199(E), 216(H)

**106. Ans ( 2 )**

NCERT XII Pg # 203(E), 221(H)

**108. Ans ( 1 )**

NCERT XII Pg # 198(E), 215(H)

**109. Ans ( 4 )**

NCERT XII Pg # 187(E), 204(H)

**145. Ans ( 3 )**

NCERT (XII) Pg # 177(E), 192(H)

**151. Ans ( 2 )**

NCERT (XII) Pg # 211(E), 230(H)

**152. Ans ( 3 )**

NCERT (XII) Supplementary material

Pg # 288(E), 315(H)

**153. Ans ( 3 )**

NCERT XII Pg.# 213 (E), 231 (H)

**164. Ans ( 3 )**

NCERT-XII Pg # 174, 175 (E), 189, 190 (H)

**165. Ans ( 4 )**

NCERT-XII Pg # 82 (E), 90 (H)