NEET FRESH 2023-24

| Mark 720 | Group PCB | PCB EXAM - 66 | Date : 14/01/2024 Time : 3:20 Hours |

Answer Key Version - S (NEET FRESH All Batches)

Physics

Sec. A	11. 3	22. 3	33. 1	43. 2
01. 1	12. 2	23. 1	34. 1	44. 3
02. 3	13. 3	24. 4	35. 2	45. 4
03. 4	14. 1	25. 3	Sec. B	46. 1
04. 3	15. 2	26. 1	36.	47. 3
05. 1	16. 2	27. 4	37. 1	48. 3
06. 3	17. 2	28. 3	38. 2	49. 1
07. 2	18. 3	29. 4	39. 3	50. 1
08. 2	19. 1	30. 4	40. 3	
09. 2	20. 1	31. 1	41. 2	
10. 4	21. 1	32. 3	42. 1	

Chemistry

Sec. A	61. 4	72. 1	83. 3	93. 3
51. 3	62. 3	73. 1	84. 4	94. 2
52. 1	63. 3	74. 1	85. 3	95. 2
53. 1	64. 2	75. 4	Sec. B	96. 3
54. 4	65. 1	76. 4	86. 2	97. 2
55. 3	66. 1	77. 2	87. 4	98. 1
56. 2	67. 1	78. 3	88. 1	99. 3
57. 1	68. 2	79. 4	89. 4	100. 3
58. 1	69. 4	80. 3	90. 2	
59. 4	70. 3	81. 2	91. 4	
60. 1	71. 3	82. 1	92. 2	

Biology

Part-I Sec.A	110. 3	121. 1	132. 1	142. 4	Part-II Sec.A	160. 4	171. 2	182. 4	192. 2
	111. 4	122. 2	133. 3	143. 2		161. 1	172. 1	183. 4	193. 3
101. 1	112. 2	123. 4	134. 1	144. 2	151. 1	162. 4	173. 1	184. 1	194. 1
102. 3	113. 3	124. 3	135. 1	145. 3	152. 4	163. 4	174. 4	185. 2	195. 3
103. 1	114. 3	125. 3	Sec.B	146. 3	153. 4	164. 2	175. 2	Sec. B	196. 3
104. 1	115. 2	126. 2	136. 3	147. 3	154. 1	165. 2	176. 4	186. 3	197. 1
105. 1	116. 2	127. 3	137. 2	148. 4	155. 1	166. 2	177. 1	187. 2	198. 4
106. 4	117. 1	128. 4	138. 4	149. 1	156. 4	167. 1	178. 4	188. 3	199. 4
107. 4	118. 1	129. 3	139. 2	150. 3	157. 3	168. 1	179. 2	189. 3	200. 2
108. 1	119. 1	130. 1	140. 1		158. 3	169. 2	180. 2	190. 2	
109. 1	120. 1	131. 4	141. 1		159. 4	170. 3	181. 2	191. 3	

PHYSICS

SECTION - A (35 Questions)

01. **(1)** $E = \dfrac{\sigma}{2\varepsilon_0}$

02. **(3)** At $O, E \neq 0, V = 0$
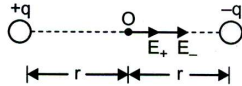
03. **(4)** Conducting surface behaves as equipotential surface.

04. **(3)** By using $W = Q \cdot \Delta V \Rightarrow \Delta V = \dfrac{2}{20} = 0.1\,\text{volt}$

05. **(1)** Electric field due to all hollow spherical conductor is governed by following equation $E = 0$, for $r < R$

and $E = \dfrac{Q}{4\pi\varepsilon_0 r^2}$ for $r \geq R$ ...(i)

i.e. inside the conductor field will be zero and outside the conductor will vary according to

$E \propto \dfrac{1}{r^2}$

06. **(3)** Change in kinetic energy
= Force × Displacement = qEy

07. **(2)** $KE - 0 = q(V_1 - V_2)$
= 2 × 1.6 × 10⁻¹⁹ × (70 – 50) = 40 KeV

08. **(2)** $E_{\text{inside}} = \dfrac{\rho}{3\varepsilon_0} r$ $(r < R)$

$E_{\text{outside}} = \dfrac{\rho R^3}{3\varepsilon_0 r^2}$ $(r \geq R)$

i.e. inside the uniformly charged sphere field varies linearly ($E \propto r$) with distance and outside varies according to $E \propto \dfrac{1}{r^2}$

09. **(2)** Force on electron $F = QE = Q\left(\dfrac{V}{d}\right)$

$\Rightarrow F = (1.6 \times 10^{-19}) \left(\dfrac{1000}{2 \times 10^{-3}}\right) = 8 \times 10^{-14}\,\text{N}$

10. **(4)** Given,

$E = (2\hat{k} + 3\hat{j} + \hat{k})\,\text{NC}^{-1}$ and $S = 10\hat{i}\,\text{m}^2$

We know that, Electric flux,

$\phi = \overline{E} \cdot \overline{S} = (2\hat{i} + 3\hat{j} + \hat{k}) \cdot (10\hat{i}) = 20\,\text{Nm}^2\,\text{C}^{-1}$

11. **(3)** $KE = QV \Rightarrow KE = (2e)200\,\text{V} = 400\,\text{eV}$

12. **(2)** Relation for electric field is given by $E = \dfrac{\lambda}{2\pi\varepsilon_0 r}$

(Given : $E = 7.182 \times 10^8$ N/C)

$r = 2$ cm $= 2 \times 10^{-2}$ m

$\dfrac{1}{4\pi\varepsilon_0} = 9 \times 10^{-9} \Rightarrow \lambda = 2\pi\varepsilon_0 rE = \dfrac{2 \times 2\pi\varepsilon_0 rE}{2}$

$= \dfrac{2 \times 10^{-2} \times 7.182 \times 10^8}{2 \times 9 \times 10^9} = 7.98 \times 10^{-4}$ C/m

13. **(3)** Potential energy of the system

$\dfrac{-kqQ}{x} - \dfrac{kQq}{x} - \dfrac{kq^2}{2x} = 0$

$\dfrac{-4kqQ + kq^2}{2x} = 0 \Rightarrow kq^2 = 4kQq$

$\Rightarrow \dfrac{q}{Q} = 4$

14. **(1)** By Gauss' theorem,

$|\phi_E| = \left|\dfrac{q}{\varepsilon_0}\right| = \left|\dfrac{-2e}{\varepsilon_0}\right| = \dfrac{2e}{\varepsilon_0}$

15. **(2)**

16. **(2)** Charge flows from higher potential to low potential

$\dfrac{KQ_1}{1} = \dfrac{KQ_2}{3} \Rightarrow Q_2 = 3Q_1$

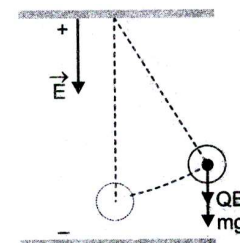$Q_1 + Q_2 = 4 \times 10^{-2} \Rightarrow 4Q_1 = 4 \times 10^{-2}$

$Q_1 = 10^{-2}$ C $\Rightarrow Q_2 = 3Q_1 = 3 \times 10^{-2}$

Final charge on the bigger sphere

$Q_1 = 3 \times 10^{-2}$ C

17. **(2)** The electric field will be maximum at B, as the di-rection of electric field is along decreasing potential $V_B > V_C > V_A$.
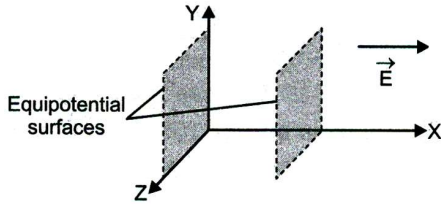
18. **(3)**

Net downward force $mg' = mg + QE$

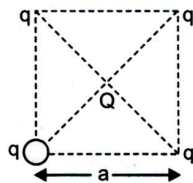$\Rightarrow$ Effect acceleration $g' = \left(g + \dfrac{QE}{m}\right)$

Hence time period

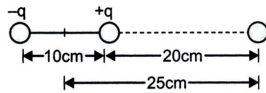$$T = 2\pi \sqrt{\frac{l}{g'}} = 2\pi \sqrt{\frac{l}{\left(g + \frac{QE}{m}\right)}}$$

19. **(1)**

20. **(1)** From symmetry of the figure all corner have same electric potential. Therefore work done in moving the charge q from the corner to the diagonally opposite corner is zero.

21. **(1)**

By using $E = 9 \times 10^9 \cdot \frac{2pr}{(r^2 - l^2)^2}$; where

$p = (500 \times 10^{-6}) \times (10 \times 10^{-2}) = 5 \times 10^{-5} c \times m$,
$r = 25\ cm = 0.25\ m$, $l = 5\ cm = 0.05\ m$

$E = \frac{9 \times 10^9 \times 2 \times 5 \times 10^{-5} \times 0.25}{\{(0.25)^2 - (0.05)^2\}^2} = 6.25 \times 10^7\ N/C$

22. **(3)** Electric potential inside a conductor is constant and it is equal to that on the surface of the conductor.

23. **(1)** Here $v^2 - u^2 = 2as$ $v^2 = 0^2 + 2\left(\frac{qE}{m}\right)e$

$v = \sqrt{\frac{2qE}{m}}e$ $\Rightarrow v = \sqrt{\frac{2qEl}{m}}$

24. **(4)** $\vec{E} = -\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}$

$= -[(6 - 8y)\hat{i} + (-8x - 8 + 6z)\hat{j} + (6y)\hat{k}]$

At $(1,1,1)$, $\vec{E} = 2\hat{i} + 10\hat{j} - 6\hat{k}$

$\Rightarrow (\vec{E}) = \sqrt{2^2 + 10^2 + 6^2} = \sqrt{140} = 2\sqrt{35}$

$\therefore F = q\vec{E} = 2 \times 2\sqrt{35} = 4\sqrt{35}$

25. **(3)** Option (1) shows lines of force starting from one positive charge and terminating at another. Option (2) has one line of force making closed loop.

Option (4) shows all lines making closed loops. All these are not correct. Only option (3) is correct.

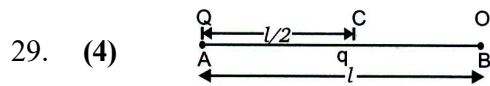26. **(1)** As the regions are of equipotentials, so Work done $W = q\Delta V$

ΔV is same in all the cases hence work-done will also be same in all the cases.

27. **(4)** Electrostatic potential energy of the given system is given as,

$U = \frac{1}{4\pi\varepsilon_0} \times \frac{1}{a}(Qq + Qq + q^2)$

$U = 0$ $2Qq = -q^2$ $\Rightarrow$ $Q = -q/2$

28. **(3)** In uniform electric field dipole experience only torque, but no force.

29. **(4)**

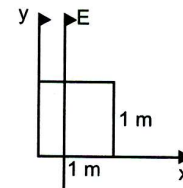$\Rightarrow$ value of q such that all three charges are in equilibrium.

i.e. F...at B = zero

$\hat{F}_{BA} + \hat{F}_{BC} = 0$ or $|\hat{F}_{BA}| = |\hat{F}_{BC}|$

$\frac{1}{4\pi\varepsilon_0}\frac{Q^2}{l^2} = \frac{1}{4\pi\varepsilon_0}\frac{Qq}{l^2/4}$

$\Rightarrow Q = q(4) \Rightarrow q = \left(\frac{Q}{4}\right)$

As, $\hat{F}_{BA} = -\hat{F}_{BC}$ $\Rightarrow q = \left(-\frac{Q}{4}\right)$

30. **(4)**

The flux passing through the square of 1 m placed in xy-plane inside the electric field is zero because

$\phi = EA\cos 90^\circ = 0$

31. **(1)** As per Coulomb's law, $F = k\frac{q_1 q_2}{r^2}$

According to questions,

$F = k\frac{(q_1/2)(q_1/2)}{(r/2)^2} = k\frac{q_1 q_2}{r^2} = F$

This, force between them will remain same.

32. **(3)** Electric field is perpendicular to the equipotential surface and is zero every where inside the metal.

33. **(1)** By using $QE = mg$

$\Rightarrow E = \dfrac{mg}{Q} = \dfrac{10^{-6} \times 10}{10^{-6}} = 10$ V/m upward

because charge is positive.

34. **(1)** We know that, electric field at distance r from an infinitely long line charge is given by

$E = \dfrac{\lambda}{2\pi\varepsilon_0 r} \Rightarrow \lambda = 2\pi\varepsilon_0 \cdot rE$

35. **(2)** Using, q = ne

$\Rightarrow 2 = n \times 1.6 \times 10^{-19}$

$\Rightarrow n = \dfrac{2}{1.6 \times 10^{-19}} = 1.25 \times 10^{19} = 125 \times 10^{17}$

electrons

Section - B (Attempt Any 10 Questions)

36. **(1)** When dipole is given a small angular displacement θ about it's equilibrium position, the restoring torque will be

$\tau = -pE\sin\theta = -pE\theta$ (as $\sin\theta = \theta$)

or $I\dfrac{d^2\theta}{dt^2} = -pE\theta$ (as $\tau = I\alpha = I\dfrac{d^2\theta}{dt^2}$)

or $\dfrac{d^2\theta}{dt^2} = w^2\theta$ with $\omega^2 = \dfrac{pE}{I} \Rightarrow \omega = \sqrt{\dfrac{pE}{I}}$

37. **(1)** If a body acquires positive charge, then it means that it lost few electrons. In this way its mass decreases.
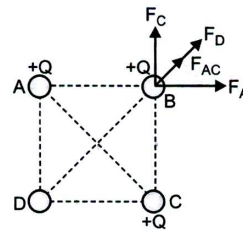
38. **(2)**
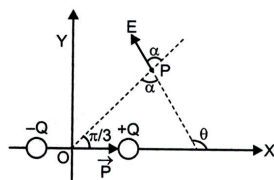
$\theta = \dfrac{\pi}{3} + \alpha$ where $\tan\alpha = \dfrac{1}{2}\tan\dfrac{\pi}{3}$

$\Rightarrow a = \tan^{-1}\sqrt{3}/2$ so, $\theta = \dfrac{\pi}{3} + \tan^{-1}\sqrt{3}/2$

39. **(3)** Since $V = \dfrac{W}{Q}$, more work will be done for a positive charge of two units as compared to positive charge of one unit, but the ratio $\dfrac{W}{Q}$ is same.

Therefore potential difference is same.

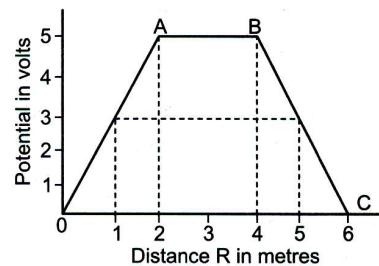40. **(3)** After following the guidelines mentioned above

$F_{net} = F_{AC} + F_D = \sqrt{F_A^2 + F_C^2} + F_D$

Since $F_A = F_C = \dfrac{kq^2}{a^2}$ and $F_D = \dfrac{kq^2}{(a\sqrt{2})^2}$

$F_{net} = \dfrac{\sqrt{2}kq^2}{a^2} + \dfrac{kq^2}{2a^2} = \dfrac{kq^2}{a^2}\left(\sqrt{2} + \dfrac{1}{2}\right)$

$= \dfrac{q^2}{4\pi\varepsilon_0 a^2}\left(\dfrac{1 + 2\sqrt{2}}{2}\right)$

At $R = 1$m, $E = -\dfrac{(5-0)}{(2-0)} = -2.5\,\dfrac{V}{m}$

41. **(2)** A $\to$ (2); B $\to$ (3); C $\to$ (4); D $\to$ (1)

42. **(1)** Net field at origin

$E = \dfrac{q}{4\pi\varepsilon_0}\left[\dfrac{1}{1^2} + \dfrac{1}{2^2} + \dfrac{1}{4^2} + \dots \infty\right]$

$= \dfrac{q}{4\pi\varepsilon_0}\left[1 + \dfrac{1}{4} + \dfrac{1}{16} + \dots \infty\right]$

$= \dfrac{q}{4\pi\varepsilon_0}\left[\dfrac{1}{1 - \dfrac{1}{4}}\right] = 12 \times 10^9\, q$ N/c

43. **(2)** $V = \dfrac{1}{4\pi\varepsilon_0}\dfrac{q}{r}$

Here, the electric potential at point A

$V = 2V_{+ve} + 2V_{-ve}$

44. **(3)** When charge q is released in uniform electric field E, then its acceleration

$a = \dfrac{qE}{m}$ (constant)

So, its motion will be uniformly accelerated motion and its velocity after t second is given by
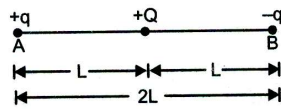
$$v = at = \frac{qE}{m}t$$

The KE of charged particle,

$$KE = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{qE}{m}t\right)^2 = \frac{q^2E^2t^2}{2m}$$

$$V = \frac{1}{4\pi\varepsilon_0}\left[\frac{2q}{L} - \frac{2q}{L\sqrt5}\right] \quad V = \frac{2q}{4\pi\varepsilon_0 L}\left(1 - \frac{1}{\sqrt5}\right)$$

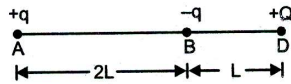45. **(4)** Work done is equal to charge in potential energy.

In Ist case, when charge $+Q$ is situated at C.

Electric potential energy of system

$$U_1 = \frac{1}{4\pi\varepsilon_0}\frac{(q)(-q)}{2L} + \frac{1}{4\pi\varepsilon_0}\frac{(-q)Q}{L} + \frac{1}{4\pi\varepsilon_0}\cdot\frac{qQ}{L}$$

In IInd case, when charge $+Q$ is moved from C to D.

Electric potential energy of system in that case

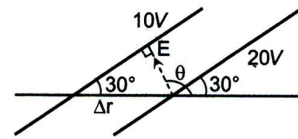$$U_2 = \frac{1}{4\pi\varepsilon_0}\cdot\frac{(q)(-q)}{2L} + \frac{1}{4\pi\varepsilon_0}\cdot\frac{qQ}{3L} + \frac{1}{4\pi\varepsilon_0}\frac{(-q)(Q)}{L}$$

Work done = $\Delta U = U_2 - U_1$

$$= \left(-\frac{1}{4\pi\varepsilon_0}\frac{q^2}{2L} + \frac{1}{4\pi\varepsilon_0}\frac{qQ}{3L} - \frac{1}{4\pi\varepsilon_0}\frac{qQ}{L}\right)$$

$$= \left(-\frac{1}{4\pi\varepsilon_0}\frac{q^2}{2L} - \frac{1}{4\pi\varepsilon_0}\cdot\frac{qQ}{L} + \frac{1}{4\pi\varepsilon_0}\cdot\frac{qQ}{L}\right)$$

$$= \frac{qQ}{4\pi\varepsilon_0}\cdot\left[\frac{1}{3L} - \frac{1}{L}\right] = \frac{qQ}{4\pi\varepsilon_0}\frac{(1-3)}{3L}$$

$$= \frac{-2qQ}{12\pi\varepsilon_0 L} = -\frac{qQ}{6\pi\varepsilon_0 L}$$

46. **(1)** Electric field at the center of uniformly charged half ring is

$$E = \frac{2k\lambda}{R} = 2\cdot\frac{1}{4\pi\varepsilon_0}\cdot\frac{q}{\pi R}\cdot\frac{1}{R} = \frac{q}{2\pi^2\varepsilon_0 R^2}$$
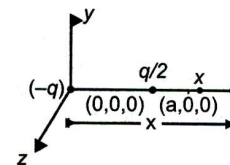
47. **(3)** Using $dV = -\vec{E}\cdot\vec{dr}$

$$\Rightarrow \quad \Delta V = -E\cdot\Delta r\cos\theta \Rightarrow E = \frac{-\Delta V}{\Delta r\cos\theta}$$

$$\Rightarrow \quad E = \frac{-(20-10)}{10\times10^{-2}\cos120^\circ}$$

$$= \frac{-10}{10\times10^{-2}(-\sin30^\circ)} = \frac{-10^2}{-1/2} = 200\,\text{V/m}$$

48. **(3)** Suppose the field vanishes at a distance r, we have

$$\frac{Kq}{x^2} = \frac{Kq}{2(x-a)^2}$$

$$\Rightarrow \quad 2(x-a)^2 = x^2 \Rightarrow \sqrt2(x-a) = x$$

$$\Rightarrow \quad (\sqrt2-1)x = \sqrt2 a \Rightarrow x = \frac{\sqrt2 a}{\sqrt2-a}$$

49. **(1)** Electric field at a point is equal to the negative gradient of the electrostatic potential at that point. Potential gradient relates with electric field according to the following relation $E = \frac{-dV}{dr}$

$$\vec{E} = -\frac{\partial V}{\partial x} = \left[-\frac{\partial V}{\partial x}\hat{i} - \frac{\partial V}{\partial y}\hat{j} - \frac{\partial V}{\partial z}\hat{k}\right]$$

$$= [\hat{i}(2xy+z^3) + \hat{j}x^2 + \hat{k}3xz^2]$$

50. **(1)** Intensity at 5m is same as at any point between B and C because the slope of BC is same throughout (i.e., electric field between B and C is uniform). Therefore electric field at $R = 5$m is equal to the slope of line BC hence by $E = \frac{-dV}{dr}$;
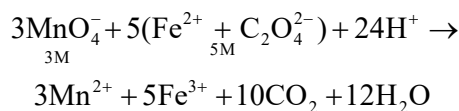
$$E = -\frac{(0-5)}{6-5} = 2.5\frac{V}{m}$$

CHEMISTRY

## SECTION - A (35 Questions)

51. (3)

$[Ni(NH_3)_6]Cl_2$ has two unpaired electron.

52. (1)

The solubility of silver bromide in hypo solution due to the formation of $[Ag(S_2O_3)_2]^{3-}$.

53. (1)

It is one third of its molecular weight in alkaline medium

54. (4)

$Fe(CO)_5$ has dsp^3-hybridisation so it show trigonal bipyramidal geometry.

55. (3)

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

O.N. of Co = + 3

Due to paired e^- it is diamagnetic

56. (2)

Decreases from +6 to +3.

$$K_2Cr_2O_7 + 4H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + 4H_2O + 3O$$
$$[H_2S + [O] \rightarrow S + H_2O] \times 3$$
$$\overline{K_2\overset{+6}{Cr_2}O_7 + 4H_2SO_4 + 3H_2S \rightarrow}$$
$$K_2SO_4 + \overset{+3}{Cr}(SO_4)_3 + 7H_2O + 3S$$

57. (1)

$2KMnO_4 + KBr + H_2O$
$\rightarrow 2KOH + 2MnO_2 + KBrO_3$

58. (1)

$-0.6\Delta_0$

59. (4)

$[Co(en)_3]^{3+}, [Co(NH_3)_6]^{3+}, [Co(H_2O)_6]^{3+}$

60. (1)

$$3MnO_4^- + 5(\underset{5M}{Fe^{2+} + C_2O_4^{2-}}) + 24H^+ \rightarrow$$
$$\underset{3M}{} 3Mn^{2+} + 5Fe^{3+} + 10CO_2 + 12H_2O$$

Thus 5M of FeC_2O_4 is oxidized by 3M of $KMnO_4$ then 1M of FeC_2O_4 is oxidized by 3/5 mole of $KMnO_4$.

61. (4)
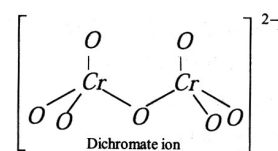
There are six equivalent Cr–O bonds and one Cr–O–Cr bond.

62. (3)

$Ni(CO)_4$ and $[Ni(CN)_4]^{2-}$ are diamagnetic and $NiCl_4^{2-}$ is paramagnetic.

63. (3)

Here Co is present as Co^{2+} ion which has 3 unpaired electrons. So the spin magnetic moment will be $\sqrt{3(3+2)}$, i.e., $\sqrt{15}$ B.M.
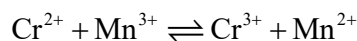
64. (2)

Colour of transition metal ion salt is due to d - d transition of unpaired electrons of d-orbital. Metal ion salt having similar number of unpaired electron in d-orbitals shows similar colour in aqueous medium
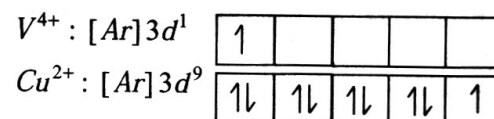
Number of unpaired electrons = 1

65. (1)

$Cr^{2+} + Mn^{3+} \rightleftharpoons Cr^{3+} + Mn^{2+}$

Cr^{3+} is a reducing agent Mn^{3+} is an oxidising agent both Cr^{2+} & Mn^{3+} exhibit d^4 electronic configuration.

66. (1)

6.08×10^{-6}
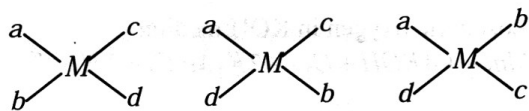
67. (1)

$[Co(NH_3)_3Cl_3]$

68. **(2)**

The complex is of the type [Mabcd]

      M = metal

      a, b, c, d = Monodentate ligands.

3 geometrical isomers

69. **(4)**

The complexes can be written as follows

$[Co(NH_3)_6]Cl_3 \, [Co(NH_3)_5Cl]Cl_2 \, [Co(NH_3)_4Cl_2]Cl$
     (A)   (B)   (C)
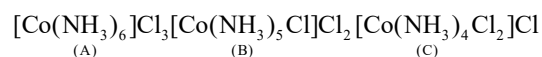
70. **(3)**

According to the relation

$$\Delta_t = \frac{4}{9}\Delta_0$$

71. **(3)**

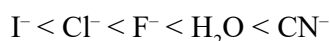Maximum MP in 3d series is shown by Cr because of maximum no. of unpaired e^- and hence maximum extent of d – d overelapping.

72. **(1)**

$La(OH)_3$ is less basic than $Lu(OH)_3$

73. **(1)**

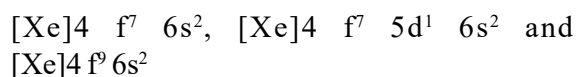Cis-platin

74. **(1)**

$I^- < Cl^- < F^- < H_2O < CN^-$

75. **(4)**

$[Xe]4\,f^7\,6s^2$, $[Xe]4\,f^7\,5d^1\,6s^2$ and $[Xe]4\,f^9\,6s^2$

76. **(4)**

Lanthanons and Aluminium have no comparison, neither they are in same group nor in period.

77. **(2)**

Ferrous ammonium sulphate

78. **(3)**

As the number of ions if complex compounds when dissolved in water increases, molar conductivity also increases.

1 mole of $[Pt(NH_3)_2Cl_2]$ gives one mole of ions

1 mole of $[Co(NH_3)_4Cl_2]\,Cl$ gives two mole of ions

1 mole of $K_4[Fe(CN)_6]$ gives five moles of ions
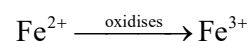
1 mole of $[Fe(CO)_5]$ gives zero moles of ions

      [because it is a neutral molecule]

Hence $K_4[Fe(CN)_6]$ has the highest molar conductivity.

79. **(4)**

V^{2+}, VO^{2+}

80. **(3)**

$Fe^{2+} \xrightarrow{\text{oxidises}} Fe^{3+}$

81. **(2)**

By applying the EAN rule, the stability of metal carbonyls can be predicted. All the given metal carbonyls expect $Mn(CO)_5$ follow the EAN rule and thus, it exists as dimer $Mn_2(CO)_{10}$

82. **(1)**

Octahedral complexes of the type $[Ma_4B_2]$, $[Ma_2B_4]$, $[MA_3B_3]$ exhibit geometrical isomerism.

83. **(3)**

Due to d^5 configuration, metallic bonds are weak. d^5 orbital is half filled as a result 3d electrons are more tightly held by the nucleus and this reduces the de-localization of electrons resulting in weaker metallic bonding.

84. **(4)**

The actinoids exhibit more number of oxidation states in general than the lanthanoids. hence, (4) is correct.

85. **(3)**

3

SECTION - B (Attempt Any 10 Questions)

86. **(2)**

Moles of $CoCl_3.6NH_3 = \dfrac{2.675}{267.5} = \dfrac{1}{100}$ mole $=$ 0.01 mole

Moles of $AgCl = \dfrac{4.78}{143.5} = \dfrac{3}{100}$ mole $=$ 0.03 mole

0.01 mole of compound gives moles of AgCl = 0.03 mole

So, 1 mole of compound gives moles of $AgCl = \dfrac{0.03}{0.01} = 3$ mole. So, structural formula of compound having $3Cl^-$ ions out side of coordination sphere, so formula is $[Co(NH_3)_6]Cl_3$

87. **(4)**

$[K_2[Ni(EDTA)]$

88. **(1)**

In $K_3[Fe(CN)_6]$ the ligand are negative which is present in coordination spheres shows a dual behaviour. It may satisfy both primary & secondary valencies while neutral ligand satisfies only secondary valencies.

89. **(4)**

Co(III) is more stable in octahedral complexes and Osmium shows (VIII) oxidation state.

90. **(2)**

The basic character of any element changes with the oxidation state, low oxidation states are more basic and high oxidation state are more acidic. For example, MnO and Mn_2O_3 are basic while Mn_2O_7 is acidic in nature.

91. **(4)**

Co (Z = 27)

92. **(2)**

$[CuCl_2 \{O = C(NH_2)_2\}_2]$

93. **(3)**

The assertion is correct but the reason is false. Actually transition metal show variable valency due to very small difference between the ns^2 and $(n-1)d$ electrons, Therefore, assertion is correct but reason is false.

94. **(2)**

$2MnO_4^- + 16H^+ + C_2O_4^{--}$
$$\rightarrow 2Mn^{+2} + 2CO_2 + 8H_2O$$
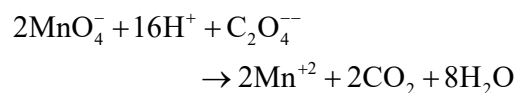
95. **(2)**

Fact

96. **(3)**

As +ve charge on the central metal atom increases, the less readily the metal can donate electron density into the $\pi*$ orbitals of CO ligand to weaken the $C-O$ bond. Hence the $C-O$ bond would be strongest in $Mn(CO)_6^+$.

97. **(2)**

There is no regular trend in the $E^0(M^{2+}/M)$ values because of irregular variation of ionization energies and sublimation energies of the atoms of the members of the transition series.

98. **(1)**

$$VO_2^+ < Cr_2O_7^{2-} < MnO_4^-$$

99. **(3)**

$Ni^{2+} + 2DMG \xrightarrow{NH_4^+OH^-} [Ni(DMG)_2]$
Red
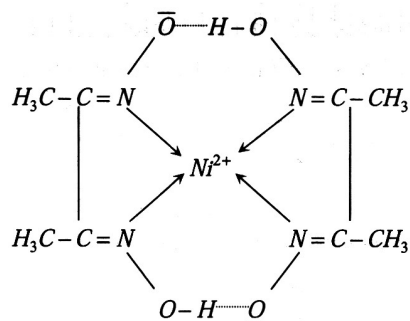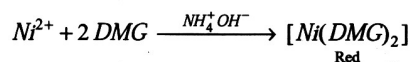
DMG is strong field ligand $\therefore$ all e^- are rearranged as
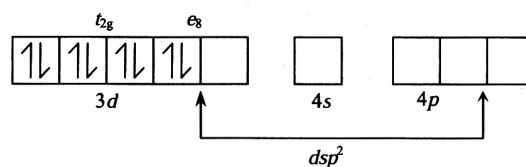
Hence complex is square planar.

100. **(3)**

Both points (1) and (2) are correct