

CHEMISTRY PAPER – I (SOLUTION)

21. (B)

Sol. For metal - metal insoluble salt electrode

$$E_{\text{Cl}^- / \text{AgCl} / \text{Ag}} = E_{\text{Ag}^+ / \text{Ag}} + \frac{0.059}{1} \log_{10} k_{\text{sp}}$$

$$0.2 = 0.79 + 0.059 \log_{10} k_{\text{sp}}$$

$$\text{So, } k_{\text{sp}} = 10^{-10}$$

Now, in presence of 0.1M AgNO₃,

$$\text{Solubility of AgCl} = \frac{10^{-10}}{0.1} = 10^{-9} \text{ mole/l}$$

So, solubility in 10⁶ lt will be = 10⁻³ moles or 1 milli mole

22. (C)

$$\text{Sol. } -\frac{1}{3} \frac{d(A)}{dt} = k[A]^2 \dots(1)$$

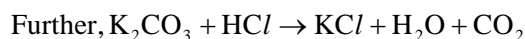
$$\text{Here } K = 1 \times 10^{-3} \text{ lt/mol} \cdot \text{min}$$

$$= \frac{1}{60} \times 10^{-3} \text{ lt/mol} \cdot \text{sec}$$

$$\text{So } -\frac{d[A]}{dt} = 3 \times \frac{1}{60} \times 10^{-3} \times (2)^2 = 2 \times 10^{-4}$$

23. (C)

Sol.



24. (B)

Sol. Order of Reducing Character is :



25. (B)

Sol. From

$$2\pi r = n\lambda$$

$$2\pi \left(0.5 \frac{n^2}{z} \right) = n\lambda$$

$$\text{or } \lambda \propto \frac{n}{z}$$

26. (A)

$$\text{Sol. } Z_{\text{eff}} = \left(4 - \frac{1}{100} \times 4 \right) = 3.96$$

$$\text{So, density} = \frac{3.96 \times 40}{(6 \times 10^{23})(0.5 \times 10^{-7})^3} = 2.1 \text{ g/cm}^3$$

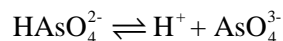
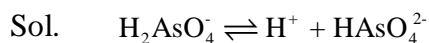
27. (D)

28. (C)

29. (B)

30. (C)

31. (A, D)



{ As it is basic buffer, so almost all the H_3AsO_4 convert into H_2AsO_4^- , so $[\text{H}_2\text{AsO}_4^-] = 0.1$ }

$$2.5 \times 10^{-4} = \frac{0.1 \times 10^{-8}}{[\text{H}_3\text{AsO}_4]}$$

$$[\text{H}_3\text{AsO}_4] = \frac{1}{25} \times 10^{-4} = 4 \times 10^{-6}$$

$$5 \times 10^{-8} = \frac{10^{-8} \times [\text{HASO}_4^{2-}]}{0.1}$$

$$[\text{HASO}_4^{2-}] = 5 \times 10^{-1} = 0.5$$

So, $[\text{HASO}_4^{2-}] = 5 [\text{H}_3\text{AsO}_4]$

$$2 \times 10^{-13} = \frac{10^{-8} \times [\text{ASO}_4^{3-}]}{0.5}$$

$$[\text{ASO}_4^{3-}] = 1 \times 10^{-5}$$

32. (A, B, C, D)

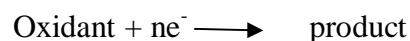
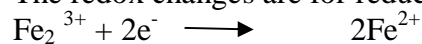
33. (C, D)

34. (A, C)

35. (B, C, D)

36. **6**

Sol. The redox changes are for reduction of Fe_2O_3 by zinc dust



Meq. Of Fe_2O_3 in 25mL

$$= \text{meq. of Fe}^{3+} \text{ in Fe}_2\text{O}_3$$

$$= \text{meq. Of Fe}^{2+} \text{ formed}$$

$$= \text{meq. Of oxidant used to oxidize Fe}^{2+} \text{ again}$$

$$\therefore \text{meq. of Fe}_2\text{O}_3 \text{ in 25mL} = \text{meq of oxidant}$$

$$= 5 \times \frac{1}{15} \times n$$

Where, n is the number of electron gained by 1 mole of oxidant

$$\therefore \text{meq. Of Fe}_2\text{O}_3 \text{ in 100mL} = 5 \times \frac{1}{15} \times n \times \frac{100}{25}$$

$$\therefore \frac{1 \times 64 \times 1000}{100 \times \frac{M}{2}} = 5 \times \frac{1}{15} \times n \times \frac{100}{25}$$

\therefore molecular wt. of $\text{Fe}_2\text{O}_3 = 160$

$$\therefore n = \frac{1 \times 64 \times 1000 \times 2}{100 \times 160 \times \frac{1}{15} \times 5 \times 4} = 6$$

Hence, number of moles of electrons gained by one mole of oxidant = 6.

37. 2

Sol. Only $[\text{Ni}(\text{CO})_4]$ and $\text{Na}_2[\text{Zn}(\text{CN})_4]$ are tetrahedral

38. 2

Sol. Let number of phenol molecules undergoing polymerization = n

$$\therefore 1 = [1 + (y - 1)x] = \left[1 + \left(\frac{1}{n} - 1 \right) \times \right]$$

$$= 1 + \left(\frac{1}{n} - 1 \right) \text{ since, } x = 1$$

$$= i = \frac{1}{n}$$

$$= \Delta T_f = 1000 K_f \frac{w_1}{m_1 w_2} \quad (i)$$

$$0.93 = 1000 \times \frac{1.86 \times 9.4}{94 \times 100}$$

$$i = \frac{1}{2} = \frac{1}{2}$$

$$\therefore n = 2$$

39. 5

40. 4