**Electrochemistry and Buffer solution (BE-073)**

1. Hydrogen electrode at 1 atm is connected with Zn electrode in which the emf (E) of the cell is found to be 0.54 V at 25°C. Suppose that [Zn++] = 1.0 M . Calculate the molar concentration of H+. (2x10-4 M)

2. What is the emf of a cell consisting of a Pb++/Pb half-cell and a Pt/H+/H2 half-cell if [Pb++] = 0.10 M, [H+] = 0.050 M, and PH2 = 1.0 atm?

3.. Calculate Cd++ concentration (x) in given cell when EMF of cell is -0.02 V

Fe/Fe++ (0.1M)//Cd++ (x M)/Cd

Where standard reduction potential of iron and cadmium electrode are -0.42V and -0.40V, respectively. (0.001 M).

4. The emf of a cell consisting of a standard AgCl/Ag, Cl- electrode and cupper electrode is 0.07V. What is the molar concentration of Cu++ ions in this cell (0.02M). Given, AgCl + e = Ag + Cl-, E0=+0.22V

5. Using given electrode (a) and (b), answer the following questions

(a) Fe++ (0.1M) - e = Fe+++ (1M), E0 = -0.77V (b) Cu++ (0.2M) + 2e = Cu, E0 = +0.34V

(i) net cell reaction (ii) spontaneity of redox reaction (iii) cell notation (iv) emf of cell

6. 100 cc of 0.2 N potassium acetate is mixed with 50 cc of 0.4M acetic acid. Calculate the pH of resultant mixture.

7. 100 cc of 0.2 M NH4OH is mixed with 200 cc of 0.05 M HCl solution. What is the pH of resultant mixture (Kb for NH3 solution is 1.8x10-5).

8. Calculate the concentration of sodium formate present in 0.1M solution of formic acid to produce of pH 3.8 (Ka =1.8x10-4) (Ans; 0.113M)

9. Calculate the pH in the titration of 25 mL of 0.10 M acetic acid by sodium hydroxide after the addition to the acid solution of (a) 10 mL of 0.10 M NaOH, and (b) 35 mL of 0.10 M NaOH. The solution becomes either acidic basic or neutral when 25 mL of 0. 1 M NaOH is added, why? 4.57 and 12.23)

10. Calculate the pH of a buffer system containing 1.0 M CH3COOH and 1.0 M CH3COONa. (b) What is the pH of the buffer system after the addition of 0.10 mole of gaseous HCl to 1 L of the solution? Assume that the volume of the solution does not change when the HCl is added.

11. Predict whether the reaction; 2 Ag + Zn++ = 2Ag+ + Zn, is feasible or not.

12. Explain about the chemical (dry) corrosion and electrochemical (wet) corrosion.

13. Point out the factors that affect the corrosion.