

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



**B.Sc. DEGREE EXAMINATION – CHEMISTRY**

**FOURTH SEMESTER – APRIL 2022**

**16/17/18UCH4MC01 – ELECTROCHEMISTRY**

Date: 16-06-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

**PART – A**

**Answer ALL the Questions:**

**(10 x 2 = 20)**

1. Define single electrode potential.
2. The standard electrode potentials of lead and silver are -0.18 V and +0.80 V respectively. Calculate the emf of the cell.
3. What is LJP? How can it be eliminated?
4. The emf of the cell  $\text{Cd, CdCl}_2.2.5\text{H}_2\text{O} // \text{AgCl, Ag}$  is 0.6753 volt at 25°C. Calculate the free energy change.
5. Define equivalent conductance of a solution.
6. Define Transport number.
7. Define activity of an electrolyte.
8. Calculate the ionic strength of 0.2M NaCl solution.
9. Define overvoltage.
10. What do you mean by decomposition potential?

**PART – B**

**Answer Any EIGHT Questions**

**(8 x 5 = 40)**

11. How will you measure emf of an unknown cell potentiometrically?
12. Define electrochemical series. Explain any five applications of it.
13. Derive Nernst equations for the determination of oxidation and reduction electrode potentials.
14. Derive an expression for the EMF of a concentration cell without transference.
15. Explain the construction, working and uses of lead acid battery.
16. State and explain Faraday's law of electrolysis.
17. Explain the variation of molar conductance with concentration.
18. State Kohlraush's law. Mention its applications.
19. Enumerate the postulates and limitations of Arrhenius theory of electrolytic dissociation.
20. Explain Debye – Huckel- Onsager equation.
21. Explain the electrochemical theory of corrosion.
22. Write down the Ilkovic equation and mention the terms involved in it.

**PART – C**

**Answer Any FOUR Questions:**

**(4 x 10 = 40)**

23. Explain the construction and working of primary and secondary reference electrodes. (10)
24. How will you determine pH of a solution using glass and quinhydrone electrode? (10)
25. (a) Discuss the construction and working of Weston Cadmium cell with a neat diagram. (5)  
(b) Discuss the principle underlying in the redox titration by potentiometric titrations. (5)
26. (a) Explain the determination of transference number by moving boundary method. (7)  
(b) Calculate the value of mean activity coefficient of 0.2M  $\text{AlCl}_3$  solution (Given that,  $A = 0.60$ ). (3)
27. (a) Explain Ostwald's dilution law. Give its demerits. (5)  
(b) Discuss Debye – Huckel theory of strong electrolyte. (5)
28. (a) Explain the principle of polarography. (6)  
(b) Give an account of hydrogen overvoltage. (4)

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