LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTH SEMESTER – APRIL 2011

# CH 4502 - ELECTROCHEMISTRY

Date : 07-04-2011 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**PART – A**

**Answer ALL questions. (10 x 2 = 20 marks)**

1. Define electromotive force.

2. What is a reversible cell.

3. Write the relationship between ΔG and EMF.

4. What are fuel cells? Give its application.

5. State Faraday’s law of electrolysis.

6. Define ionic mobility.

7. What is cell constant?

8. Define Solubility Product.

9. What is meant by decomposition potential.

10. Write down the Ilkovic equation and mention the terms involved in it.

**PART – B**

**Answer any EIGHT questions. (8 x 5 = 40 marks)**

11. What is meant by single electrode potential? How could you measure the single electrode potential?

12. Describe the construction and working of Weston cell.

13. What is the potential of a half-cell consisting of zinc electrode in 0.01M ZnSO4 solution at

25oC, Eored = −0.763 V.

14. Explain liquid junction potential. How does it affect EMF measurements?

15. Derive Nernst equation for electrode potentials.

16. Explain redox potentiometric titration with an example.

17. A solution of silver nitrate containing 12.14 g of silver in 50 ml of solution was

electrolysed between platinum electrodes. After electrolysis, 50 ml of the anode solution was found

to contain 11.55 g of silver, while 1.25 g of metallic silver was deposited on the cathode. Calculate

the transport number of Ag+ and NO3¯ ions.

18. How the Δc of an electrolyte solution can be determined.

19. How could you determine the solubility of a sparingly soluble salt by conductivity

measurements.

20. Discuss on the Debye Huckel theory of strong electrolytes.

21. Describe how the electrolytic separations of metals are carried out.

22. Explain the principle of polarography.

**PART – C**

**Answer any FOUR questions. (4 x 10 = 40 marks)**

23. Explain the following :

(i) Redox electrode (ii) Saturated calomel electrode

24. Explain any four applications of EMF.

25. How the pH of a solution can be determined using quinhydrone electrode.

26. What are concentration cells? Derive an expression for the EMF of a concentration cell with

transference.

27. (i) Discuss Arrhenius theory of electrolytic dissociation. Give its limitations.

(ii) Explain the variation of specific and equivalent conductance with concentration.

28. (i) Explain the electrochemical theory of corrosion.

(ii) Discuss the principle and procedure for conductivity titration of a weak acid with a strong base.

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