LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FOURTH SEMESTER – **APRIL 2013**

CH 4502 - ELECTROCHEMISTRY

Date: 02/05/2013   Dept. No.   Max. : 100 Marks
Time: 1:00 - 4:00

PART – A

Answer ALL questions: (10 x 2 = 20 marks)

1.   What is electromotive series?
2.   What is SHE?
3.   Calculate the ionic strength of 0.2M KCl solution.
4.   What is liquid junction potential?
5.   State Faraday's first law of electrolysis.
6.   What is Van't Hoff factor?
7.   Define molar conductance of a solution.
8.   What is cell constant?
9.   Define concentration polarisation.
10. What is corrosion?

PART – B

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

11. What is meant by standard electrode potential? How could you determine the standard electrode potential of Zinc electrode?
12. Explain the types of electrodes with examples.
13. What is the reduction potential of a half-cell consisting of zinc electrode in 0.015M $ZnSO_4$ solution at 25°C, E^o_{red} of Zn^{2+} |Zn is −0.763 V.
14. Explain the principle involved in the redox titration by potentiometry.
15. Derive Nernst equation for electrochemical reactions.
16. Explain any two commercial cells.
17. Discuss the variation of specific conductance with concentrations of solution.
18. The speed ratio of silver and nitrate ions in a solution of silver nitrate electrolysed between silver electrodes is 0.916. Find the transport number of the two ions.
19. How will you determine the solubility product of AgCl by conductivity measurements?
20. Discuss conductometric titrations with one example.
21. Explain how the electrolytic separations of metals are carried out.
22. Explain polarisation and overvoltage.

PART – C

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

23. Explain the construction and working of
     i) Weston cell   ii) Calomel electrode.   (10)

24. Explain any four applications of EMF.   (10)

25. How the p^H of a solution can be determined using quinhydrone electrode? Explain.   (10)

26. What are concentration cells? Derive an expression for the EMF of a concentration cell with transference. (10)

27. i) How will you determine the transport number by moving boundary method? (6)

ii) The molar ionic conductance at infinite dilution of lithium halide (LiX) is found to be 89.2×10^{-4} S m^2 mol^{-1}. What would be the molar ionic conductance of the halide ion if the molar ionic conductance of Li$^+$ ion is 38.70×10^{-4} S m^2 mol^{-1}? (4)

28. i) Discuss Debye – Huckel theory of strong electrolytes. (5)

ii) Explain the principle of polarography. (5)

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