



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

FOURTH SEMESTER – APRIL 2015

CH 4504/CH 4502 - ELECTROCHEMISTRY

Date : 16/04/2015
Time : 09:00-12:00

Dept. No.

Max. : 100 Marks

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 0.1M NaCl solution.
4. What are chemical cells? Give an example.
5. State Faraday's first law of electrolysis.
6. What is Van't Hoff factor?
7. Define equivalent conductance of a solution.
8. What is cell constant?
9. Define concentration polarisation.
10. What is diffusion current?

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. Describe the construction and working of Weston cell.
13. A zinc electrode is placed in 0.1 M solution of zinc sulphate at 25°C. If the degree of dissociation of salt at this concentration is found to be 0.95, calculate the electrode potential of the electrode at 25°C. Given that $E^{\circ}_{Zn^{2+}, Zn} = -0.76$ volt.
14. Explain the principle involved in the redox titration by potentiometry.
15. Derive Nernst equation for electrochemical reactions.
16. Explain the principle of Lead storage battery.
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. State Kohlraush's law and give its applications.
21. Explain how the electrolytic separations of metals are carried out.
22. Explain electrochemical theory of corrosion.

PART – C

Answer any **FOUR** questions.

(4 x 10 = 40 marks)

23. Explain the construction and working of
i) Redox electrode ii) Calomel electrode. (10)
24. Explain any four applications of EMF. (10)
25. How is the p^H of a solution determined using glass electrode?
Explain the construction and principle of glass electrode. (4+6)
26. What are concentration cells? Derive an expression for the EMF of a concentration cell with transference. (10)
27. i) Discuss the Arrhenius theory of electrolytic dissociation. Give its limitations. (5)
- ii) A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using current of 5.0 ampere for 30 minutes. What weight of Ni will be produced at the cathode? (5)
28. i) Discuss Debye – Huckel theory of strong electrolyte. (5)
- ii) Explain hydrogen over voltage. (5)

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