



B.Sc. DEGREE EXAMINATION – CHEMISTRY

FOURTH SEMESTER – **APRIL 2019**

CH 4504– ELECTROCHEMISTRY

Date: 03-04-2019
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions.

(10x2=20)

1. What is meant by reference electrode?
2. What is electromotive force?
3. Calculate the ionic strength of 0.1 M NaCl solution.
4. What are chemical cells? Give an example.
5. Define specific conductance of an electrolyte.
6. State Faraday's first law of electrolysis.
7. The resistance of 0.5 M solution of an electrolyte in a cell was found to be 45 ohm. Calculate the molar conductance of the solution if the electrodes of the cell are 2.2 cm apart and have an area of 3.8 cm^2 .
8. Define activity and mean ionic activity of an electrolyte.
9. Define concentration polarisation.
10. Define half wave potential.

PART – B

Answer any EIGHT questions.

(8x5=40)

11. How will you determine the standard electrode potential of Cu^{2+}/Cu electrode?
12. Describe the construction and working of Weston cell.
13. Define electrochemical series? Mention its significance.
14. Explain the principle involved in the redox titration by potentiometry.
15. Derive the relationship between EMF and equilibrium constant K of a cell reaction.
16. Discuss the determination of pH using glass electrode.
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. Discuss the principle of conductometric titration of HCl vs NH_4OH .
20. Derive an expression for activity coefficient.
21. Calculate the solubility product of silver chloride in water at 25°C . The solubility of silver chloride is 0.00179 g/lit .
22. Write Ilkovic equation and mention its significance.

PART – C

Answer any FOUR questions.

(4x10=40)

23. Explain the construction and working of
(a) Redox electrode (b) Calomel electrode. (5+5)
24. (a) Derive Nernst equation. (5)
(b) Explain any two applications of EMF. (5)
25. Derive an equation for the EMF of a concentration cell without transference. (10)
26. (a) How is transport number determined by Hittorf's method? (5)
(b) Discuss the Arrhenius theory of electrolytic dissociation. Give its limitations. (5)
27. Explain the behaviour of strong electrolytes on the basis of Debye-Huckel theory. (10)
28. (a) Discuss the variation of equivalent conductance with concentration. (5)
(b) How does polarography help in analyzing a mixture of inorganic ions? (5)

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