

(i) Printed Pages : 4]

Roll No.

(ii) Questions : 9]

Sub. Code :

0	3	5	2
---	---	---	---

Exam. Code:

0	0	0	4
---	---	---	---

**B.A./B.Sc.(General) 4th Semester
Examination
1047
CHEMISTRY**

(Same for B.Sc. Microbial and Food Tech.)

Paper : VII (Physical Chemistry-B)

Time : 3 Hours]

[Max. Marks : 22

Note :- Attempt five questions in all, one question from each Unit and the compulsory question. Compulsory question carries 6 marks and other questions carry 4 marks each.

Unit-I

1. (a) Draw labelled phase diagram of Mg-Zn system. Indicate clearly the eutectic points and congruent melting point on the diagram.
- (b) What is meant by upper critical solution temperature ? Illustrate phenol-H₂O system.

2,2

2. (a) State Nernst distribution law. Derive the modified expression if the solute undergoes dissociation in one of the solvents with degree of dissociation equal to α .
- (b) Discuss the application of distribution law to Parke's process for desilverisation of lead. 3,1

Unit-II

3. (a) How can the Kohlrausch's law be applied to Determine?
- (i) Ionic product of water
- (ii) Solubility of a sparingly soluble salt
- (b) During the electrolysis of a solution of Potassium Chloride between platinum-electrodes, the fall in concentration of Chloride ions in the anode chamber is 0.0137 g and 0.00857 g of silver was deposited in a silver coulometer connected in series with cell. What are the transport numbers of the Potassium ion and the chloride ion ? 2,2
4. (a) State and explain Ostwald's dilution law. What are its limitations?
- (b) 0.5 N solution of a salt placed between two platinum electrodes, 2.0 cm apart and of area of cross-section 4.0 cm^2 has a resistance of 25 ohms. Calculate the equivalent conductance of the solution. 2,2

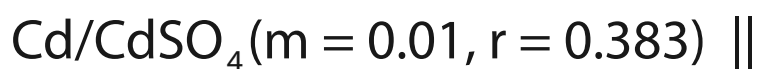
Unit-III

5. (a) A zinc rod is dipped in 0.1 M solution of ZnSO_4 at 25°C . The salt is 95% dissociated at this dilution. Calculate the electrode potential. Given that $E^\circ_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V}$.
- (b) Discuss the main applications of the electrochemical series.
6. (a) Why calomel electrode is preferred over hydrogen electrode as a reference electrode? Give the reactions occurring on the calomel electrode. 2,2
- (b) Derive Nernst equation for measuring EMF of a cell.

2,2

Unit-IV

7. (a) Calculate the EMF of the following concentration cell at 25°C :



- (b) What is the principle of Potentiometric Titrations? Also give advantages of these titrations. 2,2

8. (a) Calculate the free energy change of the given cell at 298 K:



Standard EMF of the cell is 0.014 V.

- (b) Define hydrogen over voltage. What are the factors which influence it ? Explain any two applications of it.

2,2

Unit-V

(Compulsory Questions)

9. (a) What is meant by triple point Of water ?
(b) How does specific conductance vary with dilution ?
(c) Write Debye-Huckel Onsagar equation in terms of dielectric constant (D) and Coeff. of viscosity (η) of the medium at temp T.
(d) What is liquid junction potential? How can you minimize it?
(e) Why anode is referred as oxidation electrode while cathode as reduction electrode in an electrolytic cell?
(f) Give one example each of concentration cell without transference and concentration cell with transference.

1x6=6