

(i) Printed Pages: 3

Roll No.

(ii) Questions : 9

Sub. Code :

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Exam. Code :

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B.A./B.Sc. (General) 4th Semester

1059

CHEMISTRY

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

Paper-XV Physical Chemistry-B

Time Allowed : Three Hours]

[Maximum Marks : 22

Note :— Attempt **one** question from each unit. Unit-V is compulsory. Compulsory question carries **6** marks and other **four** questions carry **4** marks each.

UNIT—I

1. (a) Describe the following terms in the phase equilibria :
 - (i) Eutectic Point
 - (ii) Cryohydric Point
 - (iii) Metastable Equilibrium. 1.5
- (b) Draw Pb-Ag phase diagram and explain 'Pattisons Process' for desilverisation of lead. 2.5
2. (a) Explain critical solution temperature by taking example of phenol-water system. 2
- (b) How is Nernst distribution law applied to determine the extent of dissociation of a solute in a solvent ? 2

UNIT—II

3. (a) Define Ostwald's dilution law. How it is used to determine the dissociation constant of acetic acid ? 2
- (b) At 25°C, the equivalent conductance at infinite dilution of KCl, HCl and CH₃COOK are 130.1, 379.4 and 95.6 $\Omega^{-1} \text{ cm}^2 \text{ eq}^{-1}$ respectively. If the equivalent conductance of a given acetic acid solution is 48.15 $\Omega^{-1} \text{ cm}^2 \text{ eq}^{-1}$ at 25°C, calculate the degree of dissociation of acetic acid. 2
4. (a) Describe moving boundary method of determination of transport number of ions. 2
- (b) Derive the relationship between ionic conductance, equivalent conductance and transport number of an ion. 2

UNIT—III

5. (a) Describe the construction and working of a Quinhydrone electrode in detail. 2
- (b) Calculate the EMF of the Zn-Ag cell at 25°C when $[\text{Zn}^{2+}] = 0.1 \text{ M}$, $[\text{Ag}^+] = 10 \text{ M}$ and E°_{Cell} at 25°C = 1.56 V.
($R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$, $F = 96500 \text{ C mol}^{-1}$) 2
6. (a) Discuss the role of Calomel electrode as a reference electrode for determination of electrode potential of any electrode. 2
- (b) Derive Nernst equation for measuring EMF of a cell. 2

UNIT—IV

7. (a) Describe the application of concentration cells in the determination of :

(i) Valency of ions

(ii) Solubility product of sparingly soluble salts. 2

- (b) Calculate ΔG° for the reaction at 25°C :



Given $E^\circ (\text{Fe}^{2+}/\text{Fe}) = -0.44 \text{ V}$ and $E^\circ (\text{Al}^{3+}/\text{Al}) = -1.66 \text{ V}$.

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8. (a) Derive an expression of EMF of electrolyte concentration cell without transference. 2

- (b) Write short notes on :

(i) Polarisation and overvoltage

(ii) Hydrogen over potential. 2

UNIT—V (Compulsory)

9. (i) Define triple point of water. Why is it different from the normal melting point of ice ?

(ii) Name any two reference electrodes.

(iii) What are reversible and irreversible cells ?

(iv) State Debye-Huckel Onsager equation. Give significance of the terms involved in it.

(v) Give applications of transport number.

(vi) Why KCl is suitable for salt bridge ? $1 \times 6 = 6$

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