

B.Sc. (CBCS Pattern) Semester - V
USCCHT10 : Chemistry Paper-II (Physical Chemistry)

P. Pages : 2

Time : Three Hours



GUG/S/23/13090

Max. Marks : 50

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw the diagrams wherever necessary.
 3. Use of scientific calculator is allowed.

1. a) Explain the terms. 5
i) Specific conductance.
ii) Equivalent conductance.
Explain the effect of dilution on specific and equivalent conductance.

- b) Describe in detail Debye-Huckel theory of strong electrolyte. 5

OR

- c) What is cell constant? How it is determined experimentally. 2½

- d) State Kohlrausch law. How it is used to determine solubility of sparingly soluble salt. 2½

- e) Explain the application of conductometric titration in the estimation of mixtures of acids. 2½

- f) The equivalent conductance at infinite dilution of H^+ and CH_3COOH^- are 2½
 349.8×10^{-4} and $40.9 \times 10^{-4} \text{ Sm}^2 \text{ eq}^{-1}$ respectively. Equivalent conductance of
0.01N CH_3COOH was found to be $16.30 \times 10^{-4} \text{ Sm}^{-2} \text{ eq}^{-1}$. Find the degree of
dissociation and percentage of dissociation of CH_3COOH at this concentration.

2. a) Define galvanic cell. Explain construction and working of Daniel cell and write its cell 5
representation.

- b) What is migration of ions? Explain the migration of ions when electrodes are attackable. 5

OR

- c) Obtain the relation between entropy change and cell emf. 2½

- d) State and explain Faradays second law of electricity. 2½

- e) Derive the relationship between ionic conduction and transport number of ions. 2½

- f) Explain the application of EMF measurement in determination of activity coefficient of 2½
electrolyte.

3. a) What is reference electrode. Explain the construction and working of Secondary reference 5
electrode.

- b) What are potentiometric titrations? Explain the nature of curve obtained in acid-base 5
titration.

OR

- c) Explain the electrolytic concentration cell without transference. 2½
- d) Explain the application of emf measurement in determination of pH. 2½
- e) Write a short note on liquid junction potential. 2½
- f) The emf of the following cell was found to be 0.1182V at 25°C.
Calculate Solubility and solubility product of AgCl.
Ag | AgCl || AgNO₃ | Ag (Given mol wt. of AgCl = 143.5). 2½
4. a) Explain the phenomenon of black body radiations. Why classical mechanics failed to explain this phenomenon. 5
- b) Derive an expression for energy and normalized wave function for a particle in one dimensional box of length 'a'. 5

OR

- c) Discuss how classical mechanics failed to explain photoelectric effect. 2½
- d) Explain Davisson-Germer experiment of wave particle duality. 2½
- e) What are the postulate of quantum mechanics. 2½
- f) What is wave function. Write the four conditions for well-behaved wave function. 2½
5. Attempt **any ten** of the following (one mark each). 10
- i) What is molar conductance?
- ii) Write Arrhenius equation and write the meaning of each term.
- iii) Define degree of dissociation.
- iv) What is ideally polarized electrode?
- v) Define reversible cell.
- vi) Write any two factors which affect the transport number.
- vii) What is electrode potential?
- viii) Write any two functions of salt bridge.
- ix) What is quinhydrone electrode?
- x) Define eigen values.
- xi) What is Zeeman effect?
- xii) What is normalized wave function.
