



HDZ-003-1103011 Seat No. _____

M. Sc. (Chemistry) (Sem. III) (CBCS) Examination

November / December - 2017

C (PM) - 304 : Physical & Material Chemistry

(Electro Chemistry) (New Course) (Ele. - II)

Faculty Code : 003

Subject Code : 1103011

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) All questions carry equal marks.

1 Answer the following : (any seven)

- Define : Transference numbers, over voltage, conductor, Degree of dissociation.
- Give an account of types of solvent.
- Explain : Acidity function.
- What are super conductors ? Give the classification of super conductors.
- What are Faraday's laws of electrolysis.
- Explain validity of Debye - Huckel onsager equation.
- Give a brief account of abnormal transference number.
- What is polarization ? Give the causes of polarization.
- Define different types of conductors.
- Determine the dissociation constant of weak acid.

2 Answer the following : (any three)

- Hydrogen over voltage.
- Dissociation constant by emf method.
- Discuss evidences for the existence of dipolar ions.
- Describe the determination of transference number by moving boundary method.

3 Answer the following :

- (a) Explain neutralization curve.
- (b) Describe the properties of super conductor in detail.

OR

- (a) Discuss ionic product of water by conductance method.
- (b) Explain the Grotthuss mechanism of electrolysis. Give evidences of ionic theory.

4 Answer the following : (any three)

- (a) Calculate the molar conductance of NH_4OH at infinite dilution from the following data :

$$\lambda_{NaOH}^{\circ} = 247.8 \times 10^{-4} \text{ cm}^2 \text{ mho mole}^{-1}$$

$$\lambda_{NH_4Cl}^{\circ} = 149.7 \times 10^{-4} \text{ cm}^2 \text{ mho mole}^{-1}$$

$$\lambda_{NaCl}^{\circ} = 126.45 \times 10^{-4} \text{ cm}^2 \text{ mho mole}^{-1}$$

- (b) Discuss the effect of pH, current density and temperature on overvoltage.
- (c) Discuss the determination of dissociation constant of ampholytes by approximate method.
- (d) Derive an expression to correlate equivalent conductance and ionic mobility in electrolytic solution.

5 Answer the following : (any two)

- (a) Explain the mechanisms of electrolytic conductance in detail.
- (b) Discuss electrolysis of water. Calculate the ionic mobility of K^+ and OH^- ions at infinite dilution.

Give that :

$$\lambda_{K^+}^{\circ} = 73.5 \times 10^{-4} \text{ mho m}^2 \text{ mol}^{-1}$$

$$\lambda_{OH^-}^{\circ} = 197.6 \times 10^{-4} \text{ mho m}^2 \text{ mol}^{-1}$$

- (c) Describe the ionic diffusion as slow process.
- (d) Explain the determination of dissociation constant by calorimetric method.