M.Sc Chemistry Examination, SEM-IV

Physical Chemistry Paper – XIV

(Electrochemistry-3539)

(April-2016)

Time: $2^{1/2}$ hours **Total Marks: 70**

Instructions: All questions carry equal marks

1 (A) Name different types of conductors with appropriate illustrations. 07

(B) What are the evidences that support ionic theory? 07

OR

1 (A) Define and discuss Faraday's first and second law of electrolysis. 10

(B) Discuss numerous applications of electrolysis. 04

2 (A) Give definition of transport number and determination it by moving boundary method. 08

(B) Explain the determination of transport numbers by Hittorf method. 06

OR

2 (A) Moving boundary experiment was carried out with a 0.01M solution of KCl ($K = 1.29\ Sm^{-1}$)

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using $CdCl_2$ as the indicator electrolyte. A current of 5.21 mA was passed through the tube of 0.230 cm^2 cross-sectional area. It was observed that the boundary moved through 4.16 cm in 1 hr. Calculate the mobility of the K^+ ion. 07

(B) Calculate the transport numbers of H^+ ions and Cl^- ions from the following data obtained by the moving boundary method using cadmium chloride as the indicator electrolyte: Concentration of HCl solution = 0.1N; mass of silver deposited in the coulometer = 0.1209; movement of boundary = 7.50 cm; cross-section of the tube = 1.24 cm^2. 07

3 Answer any **TWO** of the following. 14

(A) Discuss dissociation constant of dibasic acids.

(B) Explain effects of solvent and temperature on dissociation constants?

(C) Write brief note on acidity function.

(D)The conductance of silver ion at 18° is 55.7 and of the nitrate ion 60.8. If the specific conductivity of $AgNO_3$ in a deci-normal solution at 18°C is 0.00947 Mhos, what will be the percentage of dissociation of the salt at this concentration?

4 Answer any **TWO** of the following. 14

(A) Explain Isoelectric point.

(B) Write short notes on neutralization curves of Ampholytes

(C) Give at least five evidences that validate the existence of dipolar ions.

(D) Discuss in brief: Amphoteric electrolytes.