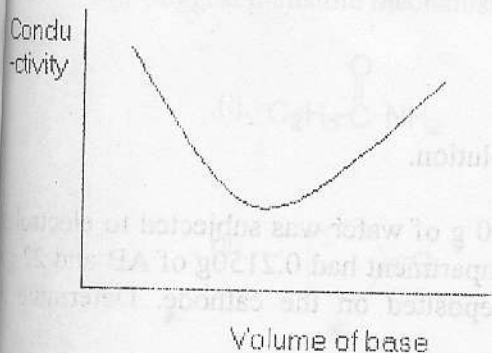


EASTERN UNIVERSITY, SRILANKA
THIRD YEAR IN SCIENCE FIRST SEMESTER 2002/2003
CH 303 ELECTROCHEMISTRY

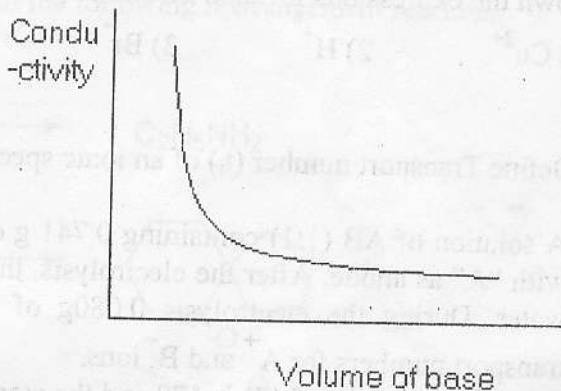
Time: 1 Hour

Answer all questions.

- (a) Explain the following curves obtained for the variation of conductivity with the volume of a base added during strong acid Vs strong base(I) and strong acid Vs weak base (II) titrations



(I)



(II)

- (b) The Onsager equation for aqueous solutions of 1:1 electrolytes at 298 K can be written as

$$\Lambda = \Lambda^\infty - (0.23 \Lambda^\infty + 60.22) C^{1/2}$$

where Λ - molar conductivity

Λ^∞ - molar conductivity at infinite dilution

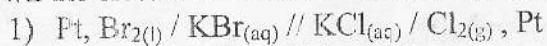
C - concentration of ionic solution in mol dm^{-3}

A conductometric titration was carried out by adding 0.01 mol dm^{-3} HCl solution to a 10.0 ml of 0.01 mol dm^{-3} AgNO_3 solution. If the limiting molar conductivities ($\text{Sm}^2 \text{mol}^{-1}$) of H^+ , Ag^+ , Cl^- and NO_3^- ions are 35.0×10^{-3} , 6.20×10^{-3} , 7.65×10^{-3} and 7.15×10^{-3} respectively, calculate the conductivity of the solution

- (i) at the beginning of the titration
- (ii) at the equivalence point of the titration and
- (iii) after twice the stoichiometrically required amount of HCl has been added.

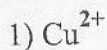
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2. (a) Write down the electrode reactions and the cell reaction for each of the following cells.



Where a_1 and a_2 refer to the activities of the HCl solutions in the left hand side and the right hand side respectively.

(b) Devise one electrode in each case for measuring the concentration of the following ions and write down the expressions for their electrode potentials in terms of their concentrations.



(c) Define Transport number (t_i) of an ionic species i , in a solution.

A solution of AB (1:1) containing 0.741 g of AB in 100 g of water was subjected to electrolysis with "A" as anode. After the electrolysis, the anode compartment had 0.2150g of AB and 22 g of water. During the electrolysis 0.080g of "A" was deposited on the cathode. Determine the transport numbers for A^+ and B^- ions.

(Molecular weight of AB is 170 and the atomic weight of A is 108)

