

**EASTERN UNIVERSITY, SRI LANKA**  
**THIRD EXAMINATION IN SCIENCE-2001/2002 (April 2002)**  
**CH 303 ELECTROCHEMISTRY**

$$F = 96,500$$

$$R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$$

$$T = 298 \text{ K}$$

26 SEP 2002

**Time: 1 hour**

**ANSWER ALL QUESTIONS.**

1. a) Discuss Debye-Huckel Onsager theory explaining the increase in conductance of strong electrolytes on dilution based upon the following effects:
  1. Relaxation effect or Asymmetry effect
  2. Electrophoretic effect
  
- b) Define molar conductivity of a solution.  
If molar conductivity for  $\text{H}^+$  and  $\text{OH}^-$  ions are  $349.8 \times 10^{-4}$  and  $198.5 \times 10^{-4} \Omega^{-1}\text{m}^2\text{mol}^{-1}$  respectively at  $25^\circ\text{C}$  and if the conductivity of water at the same temperature is  $5.54 \times 10^{-6} \Omega^{-1}\text{m}^{-1}$  calculate the ionic product of water.
  
2. a) Discuss the variations of conductivity vs. added volume of base during a weak base- strong acid titration.
  
- b) Write down the types of electrodes and give an example of each.
  
- c) Calculate the mean ionic activity coefficient of 0.1 molar HCl at  $25^\circ\text{C}$ , given that the EMF of the cell  $\text{H}_2 (1 \text{ atm}) / \text{HCl} (\text{aq}), \text{AgCl} (\text{s}) / \text{Ag}$  is 0.3524 V at  $25^\circ\text{C}$  and that the standard electrode potential of Ag-AgCl electrode is 0.2224 V at the same temperature.

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