Karanjia Auto College,Karanjia,Mayurbhanj

CC 10, CHEMISTRY HONS.

1. Answer all the questions [1×8=8]

i. Give an example of weak electrolyte. ii. Define conductivity of an electrolyte. iii. What do you mean by transport number. iv. What is the standard EMF value of hydrogen electrode at 25°C. v. Write the relation between equilibrium constant and E°. vi. What is liquid junction potential. vii. Define dipole moment. viii. Write mathematical expression for equivalent conductance.

2. Answer any **Eight** the questions

[1.5×8=12] i. Define electromotive force of a cell. ii. What is potentiometric titration. iii. What is the unit of molar conductance. iv. Define cell constant.

v. Define the term ionic mobility.

vi. Write the relation between equivalent conductance and molar conductance. vii. How to calculate degree of ionization of an electrolyte.

viii. Which metal used in calomel electrode. Ix. Represent a standard hydrogen electrode cell.

x. Write the chemical reaction involved in quinhydrone electrode.

3. Answer any **Eight** the questions [2×8=16]

i. What is wien effect.

Ii. State walden's rule.

iii. For the Daniel cell involving the cell reaction;

$Zn(s) + Cu^{2+}(aq) \leftrightarrow Zn^{2+}(aq) + Cu(s)$, the standard free energy of the reaction is 218.4kJ. Calculate EMF of the cell. iv. Derive relation between standard enthalpy of a cell with E°.

V. State faraday's first law of electrolysis.

vi. State Kohlrausch law of independent migration of ions.

vii. At infinite dilution, the eq.conductances of CH_3COONa, HCl and CH_3COOH 91, 426 AND 391 mho.cm^2 respectively. Calculate eq.conductance of NaCl at infinite dilution. viii. The resistance of 0.5 M solution of an electrolyte in a cell was found to be 45 Ω. Calculate the molar conductance of the solution if the electrodes in the cell are 2.2 cm apart and have an area of 3.8 cm^2. ix. Write Lorenz-Laurentz equation and specify each term in the equation. x. Write Clausius-Mosotti equation and specify each term in the equation.

4. Answer any **Four** questions [4×6=24]

i. Derive Debye-Huckel-Onsager equation for weak electrolyte.

ii. What is specific and equivalent conductivity. Write relation between specific conductivity, molar conductivity and equivalent conductivity. The specific conductance of 0.01M solution of acetic acid was found to be 0.0163 Sm^{-1} at 25°C. Calculate the degree of dissociation of the acid. Molar conductance of acetic acid at infinite dilution is 390.7× 10^{-4} S m^2 mol^{-1} at 25°C. iii. What is transport no.? Determine the transference number using Hittorf method.

iv. Discuss the application of conductance measurement to solubility and solubility product and in conductometric titration.

v. Derive Nernst equation. A cell is represented as follows :

$Mg(s) + 2Ag^+(0.0001M) \longrightarrow Mg^{2+}(0.130M) + 2Ag(s)$, calculate its E_{cell} if $E°_{cell}$ = 3.17 V. vi. Write short notes on following:

(a) Quinone-hydroquinone electrode

(b) Write the difference between reversible and irreversible cells.