

B.Sc. (With Credits)-Regular-Semester 2012 Sem. V
B.Sc. 3511 - Chemistry-II (Physical Chemistry)
Paper – II

P. Pages : 2

Time : Three Hours



GUG/W/16/3359

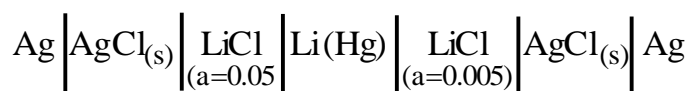
Max. Marks : 50

- Notes : 1. All **five** questions are compulsory and carry equal marks.
2. Draw diagrams and give chemical reactions wherever necessary.

1. a) What is Kohlrausch's law of independent mobility of ion. 5
- Explain its application for determine the solubility of sparingly soluble salt.
- A dilute solution of Ag NO₃ has an equivalent conductivity of
 $115.2 \times 10^{-4} \text{ sm}^2 \text{equi}^{-1}$ and the transport number of silver ion is 0.47, calculate the conductance of nitrate ion.
- b) What is conductance and cell constant. Give experimental methods for the determination of conductance and cell constant. 5

OR

- c) Explain variation of Equivalent conductance with concentration for weak and strong electrolytes. 2½
- d) What is transport number? Explain Moving boundary method for determination of transport number of ion. 2½
- e) Explain the conductometric titration curve for mixture of a strong acid and a weak acid against a strong base. 2½
Give any three advantages of conductometric titration.
- f) Write Onsager Equation. How it validate Debye Huckel Theory of strong electrolytes. 2½
2. a) Explain construction, working of Galvanic Cell. 5
- b) What is concentration cell? Explain electrolyte concentration cell without transference. 5
Calculate the EMF of following cell at 25°C.



OR

- c) Explain Reversible and Irreversible cells with suitable examples. 2½
- d) Explain Indicator electrode and reference electrode with suitable example. 2½
- e) Calculate the E.M.F. of a Daniell's cell at 25°C if Zn SO₄ and Cu SO₄ solutions are 0.1M and 0.01M respectively. 2½
(Given E° Reduction potential of Zn is -0.7623 volts & cu is +0.337 volts.)
- f) Derive the Nernst equation for E.M.F. of a cell. 2½

3. a) Explain the failure of classical mechanics on the basis of Black Body Radiation and Photoelectric effect. 5
- b) Explain the characteristics and significance of wave function. What is Normalised and Orthogonal wave function. 5
- OR**
- c) Give graphical representation of y and y^2 for a particle in one dimensional box. 2½
- d) What is Heisenberg's uncertainty principle. Calculate the uncertainty in the position of a microscopic particle whose mass is 1×10^{-30} kg and uncertainty in velocity is 10^6 m/sec. 2½
- e) Write the Schrodinger wave equation in the form of Laplacian operator and Hamiltonian operator. Explain the meaning of terms involve in it. 2½
- f) State the postulates of quantum mechanics. 2½
4. a) What are colligative properties? Explain molecular mass determination from depression of freezing point. 5
- b) Explain Diamagnetic, Paramagnetic and ferromagnetic substances. 5
- OR**
- c) What is Normality and Molarity? How will you prepare 0.1N and 0.1M solution of KMnO_4 (100 ml). 2½
- d) How Vant Hoff factor useful for determination of degree of dissociation and association of solute. 2½
- e) What is Bohr magneton and magnetic moment. 2½
- f) Explain Magnetic Susceptibility and Magnetic permeability. 2½
5. Attempt **any ten**.
- i) Write SI unit of molar conductance & Equivalent conductance. 1
- ii) Give the relationship between E.M.F. of cell and ΔH . 1
- iii) What is the value of Normalisation constant for a particle in 1D box. 1
- iv) Calculate the eigen value of the function e^{3x} and operator $\frac{d}{dx}$. 1
- v) What is relative lowering of vapour pressure. 1
- vi) What is Electrolytic cell and Electrochemical cell. 1
- vii) Why KCL is used in salt bridge is there any other option for KCL? 1
- viii) Write any two limitations of Arrhenius theory. 1
- ix) What is Osmotic pressure? 1
- x) Write the relationship between transport number and ionic conductance. 1
- xi) What is De-Broglie's wavelength? 1
- xii) Calculate the magnetic moment of a molecule having two unpaired electrons. 1
