B.SC SEM-6

Sample questions

Paper XV-Physical Chemistry

**Long questions**

1- Derive Schrodinger wave equation in the form Hψ=Eψ. Explain the terms Eigen value, Eigen function.

2-(a) Derive expression for the total energy of a particle in a three-dimensional box. Explain the concept of degeneracy.

(b) An electron has kinetic energy 2.8X10-25J. Calculate the de Broglie wavelength (Me=9.1X10-31kg.)

3-State and derive Plank’s radiation law. How it is experimentally verified? Give a brief account of the photo electric effect.

4-(a) what is molecular orbital theory? (b) Give the electron density diagram for bonding and anti bonding molecular orbitals. (c)Predict the bond order in C2 molecule with the help of MO diagram.

5-(a) what are Colligative Properties? Briefly explain how lowering of vapour pressure is used in the calculation of molecular masses of solutes.

(b) Define ideal and non ideal solutions. Give at least two examples of each of them.

6(a)-State and explain Results law for vapour pressure of binary solutions of volatile liquids.

(b)The vapour pressures of pure liquids A and B (assumed to behave ideally) are 200 Torr and 500Torr, respectively at 270C. Calculate the mole fraction in the vapour and the liquid phases of a solution of A and behaving total equilibrium vapour pressure of 350 Torr at 270C.

**Short questions: -**

7-Distinguish between: Any one (a) Photoelectric effect and Compton Effect. (b) Free energy and chemical potential (c) Hamiltonian and Hermitian operator.

8-What is an operator? When are the operators said to be commute.

9-What is Vant Hoff factor? How is it used in the determination of degree of association and degree of dissociation of a solute?

10-Briefly explain Depression in freezing point and osmotic pressure.

11-What is hybridization? Explain showing sp,sp2, sp3 hybridization.