

M.Sc. - I (Chemistry) (NEP Pattern) Semester-II
02MSCCH03 - Physical Chemistry-II

P. Pages : 2

Time : Three Hours



GUG/W/24/15352

Max. Marks : 80

-
1. a) Explain in details about MO theory applied to H_2^+ ion. 8
- b) Explain HMO theory with reference to its application to butadiene and cyclobutadiene. 8

OR

- c) Explain Russell Saunders terms & coupling schemes. 4
- d) State & explain perturbation method with its application to helium atom. 4
- e) Define hybridization and explain SP hybridization with example. 4
- f) What is term separation energies for dn configuration? 4
2. a) Explain Maxwell Boltzmann theory in detail. 8
- b) Explain the following methods to determine the value of activity and activity coefficient. 8
- i) Solubility method ii) Freezing point method

OR

- c) Describe the thermodynamic criteria for non equilibrium states. 4
- d) Explain Debye Huckel Theory for activity coefficients of electrolytic solutions. 4
- e) Obtain the expression for entropy of mixing and enthalpy of mixing of non-ideal solutions. 4
- f) Discuss the conservation of mass and energy in closed and open system. 4
3. a) Discuss Kinetics of solid state reaction. Give their applications. 8
- b) Discuss briefly the types of defects found in crystals. 8

OR

- c) Explain color centres in detail. 4
- d) Explain why coprecipitation is a precursor to solid state reactions? 4
- e) Write short notes on- 4
- i) Perfect crystal ii) Imperfect crystal

- f) Write a note on high temperature superconductivity. 4
4. a) What is neutron activation analysis? Explain in detail. 8
- b) Explain nuclear shell model in detail. Give the advantages of this model. 8

OR

- c) Explain terms- 4
- i) Magic number ii) Radioactive decay
- d) Write a note on Fermi gas model. 4
- e) Explain G.M. counter in detail. 4
- f) Give a short note on- 4
- i) Thermonuclear reactions ii) Photonuclear reactions.
5. a) Distinguish between bonding & antibonding molecular orbitals. 2
- b) What is Zeeman splitting? 2
- c) Define Ionic Strength with example. 2
- d) What is Lechatelier principle of chemical equilibrium. 2
- e) What are F-centres? 2
- f) What is p-n junction 2
- g) Describe radioactive decay. 2
- h) Give limitations of liquid drop model. 2
