7. (a) What is Van't Hoff factor ? Derive the expression from which degree of association and dissociation can be determined from Van't Hoff factor. 2½

(b) Define colligative properties. Derive the relation between relative lowering in vapour pressure and mole fraction according to Raoult's law. 2½

Roll No. .....

(07/21-II)

5253

B.Sc. EXAMINATION

(For Batch 2011 & Onwards)

(Sixth Semester)

CHEMISTRY

Paper XIX, CH-305

Physical Chemistry

Time : Three Hours *Maximum Marks :* 26

Note : Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. **1** is compulsory.

1. (a) Define Franck-Condon principle.

(b) What do you mean by a photochemical process ? Give example.

(c) Define the term Phosphorescence.

(d) What is the difference between ideal and non-ideal solutions ?

(e) Define degree of dissociation. How is it expressed ?

(f) Define Raoult's Law. 6×1=6

Section A

2. (a) Explain the concept of Potential energy curve for bonding and anti-bonding molecular orbitals in case of electronic spectra. 3

(b) Discuss selection rules for electronic spectroscopy of molecules. 2

3. Discuss energy levels of sigma, pi and *n*-molecular orbitals and transitions involved in them. 5

4. (a) State and explain Grothus-Draper's law. 2

(b) Draw Jablonski diagram and define the terms involved. 3

Section B

5. (a) Out of various methods of expressing concentration of a solution, which one is preferred and why ? 2

(b) What do you mean by relative lowering in vapor pressure ? 1

(c) The freezing point of a solution containing 0.2 g of acetic acid in 20 g benzene is lowered by 0.45°C. Calculate the degree of association of acetic acid. (K_f for benzene is 5.12 K kg mol^{-1}). 2

6. (a) Define activity and activity coefficient. 2

(b) Define Osmotic pressure and explain method of its measurement. 3