

**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.

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- (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

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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  $0.45^{\circ}\text{C}$ . Calculate the degree of association of acetic acid. ( $K_f$  for benzene is  $5.12 \text{ K kg mol}^{-1}$ ). 2

6. (a) Define activity and activity coefficient. 2  
(b) Define Osmotic pressure and explain method of its measurement. 3

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.  $2\frac{1}{2}$   
(b) Define colligative properties. Derive the relation between relative lowering in vapour pressure and mole fraction according to Raoult's law.  $2\frac{1}{2}$