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GSQ/M-20 **1753**

CHEMISTRY

Paper XIX

CH-305

Physical Chemistry

Time : Three Hours] [Maximum Marks : 26

Note : Attempt *Five* questions in all, selecting at least *two* questions from each Section.

Section A

1. (a) Describe various types of electronic transitions.

(b) What do you mean by the term symbols of molecules in electronic spectroscopy. **3,2**

2. (a) Explain Franck-Condon Principle.

(b) What type of electronic transition takes place in chromophores and why ? **3,2½**

3. (a) Draw Jablonski diagram and explain various types of transitions.

(b) Calculate the value of an Einstein of energy for a radiation of wavelength 3000 Å. **3½,1½**

4. (a) Explain quantum yield. Why the quantum yield of some photochemical reactions are very high ?

(b) Explain the physical significance of molar extinction coefficient. **3,2**

Or

A system absorbs 3×10^{18} quanta of light per second. On irradiation for 20 minutes, 0.003 moles of the reactant was found to have reacted. Calculate the quantum yield of the process. **3,2**

Section B

5. (a) State and explain Raoult's law for solutions containing non-volatile solute.

(b) 4.6 gm of ethanol dissolved in 100 gm of water gave a solution of specific gravity 0.992. Find its molarity and molality. **3,2**

6. (a) Derive thermodynamically the expression for relative lowering of vapour pressure.

(b) 1 gm of solute dissolved in 100 gm of the solvent gave a depression in freezing point = 0.2 K. Calculate the molcular mass of the solute. $K_f = 5.0$ K kg mol^{-1}. **3½,2**

7. (a) State and explain Phase Rule. Derive it thermodynamically.

(b) Explain Pattinson's process of desilverization of lead.

3,2

8. (a) Give detailed description of phase diagram of water system.

(b) Find the number of components and degree of freedom for an aqueous solution of sodium chloride.

3,2