Roll No. .....

(07/20-I)

5253

B. Sc. EXAMINATION

(Sixth Semester)

CHEMISTRY

Paper–XIX (CH-305)

Physical Chemistry

Time : Three Hours *Maximum Marks :* 26

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory and select *two* questions each from Section A and B.

1. (a) Name the molecular orbitals involved in electronic transition. **1**

(b) What are photo-inhibitors ? Give *one* example. **1**

(c) State Grothus-Draper law. **1**

(d) Define reverse osmosis. 1

(e) Out of one molar and one molal aqueous solutions which one is more concentrated and why ? 1

(f) What is "Eutectic mixture" ? 1

Section A

2. (a) Write a note on molecular orbitals involved in the electronic transitions. 3

(b) What are singlet and triplet states ? Which state has lower energy and why ? 2

3. (a) Explain the following terms : 2

(i) Parity

(ii) Intensity of electronic band.

(b) Differentiate the following : 2

(i) Fluorescence and Phosphorescence.

(ii) Internal conversion and Intersystem crossing.

(c) State Stark-Einstein's law of photo-chemical equivalence. 1

4. (a) Explain the terms : 3

(i) Absorbance

(ii) Transmittance

(iii) Molar extinction coefficient.

(b) For the photochemical reaction A $\rightarrow$ B, 1.0×10^{-5} moles of B were formed on absorption of 6.0 joules at 3000 Å. Calculate quantum efficiency.

($N = 6.02 \times 10^{23}$; $h = 6.0 \times 10^{-34}$ Js ; $C = 3 \times 10^{8}$ ms^{-1}) 2

Section B

5. (a) Derive thermodynamic relationship between depression in freezing point of a solution and mole fraction. 3

(b) Write a note on Azeotropes. 2

6. (a) Differentiate between ideal and non-ideal solution. 2½

(b) The vapour pressure of 2% aqueous solution of a non-volatile substance X at 373 K is 755 torr. Calculate the molar mass of the solute. Vapour pressure of pure water at 373 K is 760 torr. 2½

7. (a) Derive Gibbs' phase rule. Define the terms involved in it. 2½

(b) Discuss phase diagram for sulphur system. 2½