Roll No. ....

94175

B. Sc. Biotechnology 6th Semester (New Scheme) Examination – May, 2023

PHYSICAL CHEMISTRY

Paper : BT-605/BIN-604

Time : Three hours]   [Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, by selecting *one* question from each Section. Question No. **1** is *compulsory*. All question carry equal marks.

1. (a) What are chromophores ?

   (b) What is Born oppenheimer approximation ?

   (c) Define Photo-inhibitors.

   (d) What is meant by Quenching of Flourescence ?

   (e) Define Azeotropic mixture.

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(f) What is Reverse Osmosis ?

(g) What is konowaloff's rule ?

(h) Define Metastable equilibrium. $1 \times 8 = 8$

SECTION – A

2. (a) Write short note on the following :

   (i) Gerade and ingerade orbital   3

   (ii) Multiplicity of orbital   3

   (b) Explain the Intensity of Electronic bands on the basis of Electronic Transitions.   2

3. (a) Briefly explain Franck-Condon principle.   4

   (b) What is molecular spectroscopy ? Draw the molecular energy level of the first two electronic level.   4

SECTION – B

4. (a) Write a note on Photosensitization, giving *two* examples.   4

   (b) What is an Actinometer ? How does a Uranyl oxalate Actinometer Work ?   4

5. (a) Draw Jablonski's diagram. Discuss the radiative and non radiative Transition, Flourescence, Photophorescence, IC and ISC. 6

(b) State and Explain Grothus-Drapper Law. 2

SECTION – C

6. (a) Define Raoult's Law. How will you derive thermodynamically an Expression for the Relative lowering of vapour pressur. 4

(b) Define osmosis and osmotic pressur. How is osmotic pressure measured experimentally by Berkeley and Hartley's method. 4

7. (a) Derive Thermodynamically the relationship between depression in Freezing point of a solution and mole fraction of the dissolved solute. 4

(b) 3 g of ethanol in 100 g of benzene gives a vapour pressure of 800 mm of Hg at 40°C, While that of pure benzene at same temperature is 820 mm of Hg. Calculate the osmotic pressure of solution (Take density of Benzene at 0.8149 g/ml) 4

SECTION – D

8. (a) Derive Gibb's Phase rule, define the terms involved in it. 4

(b) Discuss phase diagram of water system. 4

9. (a) Draw phase diagram for Pb-Ag system. Label diagram and discuss each curve, area and eutectic point of this system. 4

(b) Discuss the phase diagram of sulphur, bring out its salient features. 4

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