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(2063)

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B. Pharmacy 2nd Semester Examination

Physical Chemistry (O.S.)

HBP-106

Time : 3 Hours **Max. Marks : 80**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt five questions in all selecting at least one from each of the selections A, B, C and D. The section E is compulsory.

SECTION - A

1. (a) Give various postulates of kinetic theory of gases. How would you justify the elastic nature of molecules during collisions. **(8)**

   (b) What is compressibility factor? Discuss the deviation of real gases from ideal gas equation using compressibility factor. **(8)**

2. (a) What is surface tension of a liquid? What are its units? Describe a method for measurement of surface tension. **(8)**

   (b) Define refractive index, specific rotation and molar refraction. What is relationship between (i) sp. refraction and refractive index, (ii) Sp. refraction and molar refraction. **(8)**

SECTION - B

3. (a) What do you understand by Ideal and non-ideal solution? Explain the positive and negative deviation from ideality. **(8)**

   (b) Explain specific, Equivalent and Molecular conductance. What is the effect of dilution on equivalent conductance. **(8)**

4. (a) Give two statements of second law of thermodynamics. Give the physical significance of entropy and its units. **(8)**

   (b) Derive the phase rule thermodynamically. **(8)**

SECTION - C

5. (a) Discuss briefly Langmuir's theory of adsorption. Derive an expression for Langmuir's unindecular adsorption isotherm. **(8)**

   (b) What is meant by chemisorption? How does it differ from physical adsorption? **(8)**

6. (a) State and explain Lambert's law and Beer's law. What are limitations of Beer's law. **(8)**

   (b) What do you understand by quantum yield of a photochemical reaction. How is it determined experimentally? **(8)**

SECTION - D

7. (a) Derive mathematically the expression for the rate constant of a second order reaction
   $A + B \rightarrow$ Products **(8)**

   (b) Write a note on acid-base catalysis. **(8)**

8. (a) What is an operator in quantum mechanics? Discuss Laplacian, hamiltonian and Hermition operators. **(8)**

(b) Solve the Schrodinger wave equation for the variable R(r). **(8)**

SECTION - E

9. (i) What is Boyle's temperature? **(2)**

(ii) How does viscosity vary with temperature. **(2)**

(iii) Why boiling point of a liquid rises and freezing point depressed when a non-volatile salute is dissolved in it? **(2)**

(iv) State third law of thermodynamics. **(2)**

(v) What is heat of adsorption? Why is it always negative? **(2)**

(vi) Distinguish between Fluorescence and Phosphorescence. **(2)**

(vii) Reactions of higher order are quite rare. Why? **(2)**

(viii) Justify whether the function cos ax is an eigen function of (a) d/dn, (b) d^2/dn^2. What is the corresponding eigen value if any? **(2)**