

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]  
(2064)

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**B. Pharmacy 2nd Semester Examination**  
**Pharmaceutical Chemistry-III (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 one question each from sections A, B, C, D. Section E is compulsory. Attempt all subparts of Section E.

**SECTION - A**

1. (a) Discuss the deviations of real gases from ideal behaviour. What is the cause of these deviations?  
(b) Give Vander Waal equation. Give the significance of Vander Waal constants a and b. (12+4=16)
2. (a) What is refractive Index? How is chemical constitution of a substance related to specific refractivity and molar refractivity?  
(b) What is optical activity? What is the cause of optical activity?  
(c) Define dipole moment. (7+7+2=16)

**SECTION - B**

3. (a) What is Roult's Law? Under what conditions this law is applicable?

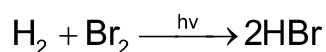
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- (b) What are colligative properties? How the molecular mass of solute is calculated from relative lowering of vapour pressure?
- (c) How does Debye Huckel Theory explains the anomalous behaviour of strong electrolytes? (6+6+4=16)
4. (a) Define First Law of thermodynamics in as many ways as you can. Give limitations of First Law of Thermodynamics.
- (b) Define second law of thermodynamics and give its utility.
- (c) Define third law of thermodynamics and give its utility. (8+4+4=16)

### SECTION - C

5. (a) Differentiate between physical and chemical adsorption.
- (b) What is Langmuir absorption Isotherm? Give its derivation and explain. (8+8=16)
6. (a) What is Quantum yield? How is it expressed?
- (b) Explain low quantum yield of reaction.



- (c) Explain the terms phosphorescence and fluorescence. (8+4+4=16)

### SECTION - D

7. (a) What is collision theory of reaction rates?
- (b) What is homogeneous catalysis? Give its mechanism taking one example.
- (c) Derive an expression for rate constant of zero order reaction. (8+6+2=16)

8. (a) Give classical mechanical observables and their corresponding quantum mechanical operators.
- (b) Derive Schrodinger wave equation in terms of postulates of quantum mechanics. (8+8=16)

**SECTION - E**

9. (a) Fill in the blanks:
- (i) Absolute zero is the temperature at which \_\_\_\_\_. (1)
  - (ii) Viscosity of liquid \_\_\_\_\_ with temperature while viscosity of a gas \_\_\_\_\_ with temperature. (2)
  - (iii) Unit of viscosity is \_\_\_\_\_. (1)
  - (iv) Arrhenius equation gives the effect of \_\_\_\_\_ on reaction rate. (1)
  - (v) The net entropy of the universe tends to \_\_\_\_\_. (1)
  - (vi) Adsorption of catalysis is explained with the help of \_\_\_\_\_ on the surface of catalyst. (1)
  - (vii) Units of entropy is \_\_\_\_\_. (1)
- (b) Define the following :
- (i) Photosensitizer
  - (ii) Constitutive property
  - (iii) Triple point
  - (iv) Isolated system
  - (v) Partition coefficient
  - (vi) Inhibitor
  - (vii) Intersystem crossing (ISC)
  - (viii) Thermochemical Reactions. (8+8=16)