Sem I (credit) FY·B·Pharm Dec 2012
Physical Pharmacy I

Con. 9512-12.

CN–7866

(3 Hours) **[Total Marks : 70**

N.B.: (1) **All** questions are **compulsory**.
(2) Draw neat labelled **diagrams** whenever **necessary**.

1. (a) Give the structure, properties and significance of liquid crystals. **3**
   (b) What is optical activity ? Give its applications. **2**
   (c) Acetone boils at 56·38°C and a solution of 1·41 grams of an Organic Solid in 20 grams of acetone boils at 56·88°C. If K_b for acetone per 100g is 16·7, calculate the mass of one mole of the Organic Solid. **3**
   (d) Give the definition, application and limitations of thermodynamics. State the different types of thermodynamic systems. **4**
   (e) State and explain Faraday's law of electrolysis. **3**

2. (a) Explain the principle behind liquefaction of gases and write a note on aerosols. **4**

OR

   (a) Explain the principle and method of liquefaction of gases by Linde's Process.
   (b) Define dipole moment. How can it be used in Elucidation of molecular structure. **3**
   (c) Derive an expression for the maximum work done when an ideal gas expands isothermally and reversibly. **4**

3. (a) Explain Raoults law and discuss with the help of diagram positive and negative deviation from Raoult's law. **4**
   (b) Explain the efficiency of heat engine. An engine operating between 150°C and 25°C takes 500J heat from a high temperature reservoir. Assuming that there are no frictional losses, calculate the work that can be done by this engine. **4**

OR

   (b) Define entropy and write its significance. Calculate the increase in entropy when one gram molecular weight of ice at 0°C melts to form water. Latent heat of fusion of ice = 80 calories.
   (c) What is the effect of dilution of a weak electrolyte on specific and equivalent conductance ? **3**

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4. (a) What are Ideal gases and Real gases ? Describe the deviations of real gases from the ideal gas equation. 4

(b) What is molar refraction (refractivity) ? Explain how it is useful in confirming the structure of molecule. 3

(c) Explain the Landsberger method for the determination of molecular mass of solute with the help of a labelled diagram. 4

OR

(c) Justify 'Depression in freezing point' is a Colligative Property.

5. (a) Define :— 4

(i) Crystalline Solids.

(ii) Amorphons Solids

(iii) Heat of fusion

(iv) Polymorphism.

(b) Explain the term 'Osmotic Pressure'. Describe Berkeley and Hartley's method for measuring osmotic pressure with a labelled diagram. 4

(c) Bond energies of F_2 and Cl_2 are 36·6 and 580 Kcal/mole respectively. Heat liberated in the reaction $F_2 + Cl_2 \rightarrow 2FCI$ is 26·6 Kcal. Find the bond energy of F-Cl bond. 3

OR

(c) Explain Hess's law of constant heat summation.

6. (a) One mole of water vapour is Confined to a 20 litre flask at 27°C. Calculate its pressure using Vander Waal's equation. 3

Given that : $a = 5{\cdot}464$ lit^2 atm. mol^{-1}

$b = 0{\cdot}0305$ lit mol^{-1}

$R = 0{\cdot}0821$ atm. lit K^{-1} mol^{-1}.

(b) Discuss principle behind distillation of binary immiscible liquid systems. 3

(c) Write a short note on Gibb's free energy. 3

(d) Write in brief about transport number. 2