I.Y. B.Pharm Sem I Reseam. Physical Pharmacy I
(CBGS)

ws Feb. 2013-(b) 19

Con. 953–13. **DC–6655**

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

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

1. (a) Give the structure, properties and significance of liquid crystals. **3**
   (b) Define optical rotation and give its applications. **3**
   (c) What is the freezing point of a solution Containing 3·42 gm of sucrose and 500 gm of water ? The molecular weight of sucrose is 342. In this relatively dilute solution, value of $k_f = 1·86$. **3**
   (d) State the different types of thermodynamic systems. **3**
   (e) State and explain Faraday's laws of electrolysis. **3**

2. (a) Explain the principle and method of liquefaction of gases by Claude's method. **4**

   OR

   (a) Explain the principle behind liquefaction of gases and write a note on aerosols.
   (b) What do you mean by Dielectric Constant and wirte its significance to pharmacy. **3**
   (c) Give the various statements of first law of thermodynamic and give its drawbacks. **4**

3. (a) Explain Raoult's law and discuss with the help of diagram positive and negative deviation from Raoult's law. **4**
   (b) Explain the efficiency of heat engine. A steam engine operates between the temperatures of 373 and 298 K : **4**
      (i) what is the theoretical efficiency of the engine ?
      (ii) If the engine is supplied with 1000 cal of heat Qhot, what is the theoretical work in ergs.

   OR

   (b) Define entorpy and its significance. Calculate the entropy increase in the evaporation of One Kilomole of water at 100°C. Molar heat of vaporisation is 40·670 MJ/Kmol.
   (c) What is the effect of dilution of a weak-electrolyte on specific and equivalent conductance ? **3**

4. (a) Define critical constants. Explain the experimental determination of critical constants. **4**
   (b) Define Refractive index. Discuss the principle and working of Abbe's refractometer. **3**
   (c) With the help of diagram, discuss the relationship between elevation of b.p. and lowering of vapour pressure. **4**

   OR

   (c) Describe a method to determine depression in freezing point of a non-volatile solute in solution with the help of a neat labelled diagram.

[TURN OVER

5. (a) State the different forms of crystal habits. 4
   (b) Explain the term 'Osmotic pressure.' Describe modern osmometer method for measuring Osmotic pressure with a labelled diagram. 4
   (c) What is bond energy ? Given that energies for H – H, O = O and O – H bonds are 104, 118, 111, Kcalmol^{-1} respectively. Calculate the heat of reaction. 3

$$H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(g)$$

OR

   (c) Write a short note on Hess's law of Constant Heat Summation.

6. (a) Two moles of NH_3 are enclosed in a five litre flask at 27°C. Calculate the pressure exerted by the gas by using Vander Walls equation. 3

Given :– a = 4·14 litre^2 atm mol^{-1}, b = 0·037 litre mol^{-1}
R = 0·082 atm.litre K^{-1} mol^{-1}

   (b) Write a short note on steam distillation. 3
   (c) Write a short note on Gibbs free energy. 3
   (d) Define :– 2
      (i) Molar Conductance
      (ii) Equivalent Conductance.