6. (a) Sketch the phase diagram for H_2O system and explain it. (6)

 (b) Derive and distinguish between order and molecularity. How the order is determined by $t_{1/2}$ method ?

 (c) Derive an expression for Kp interms of partial pressure for gaseous decomposition of N_2O_4. Show that for HI equilibrium Kp = Kc.

UNIT - IV

7. (a) State and explain first and second law of thermodynamics. (5)

 (b) Define H, Cv and Cp. Prove that Cp – Cv = R. One mole of Helium at 27°C and 1atm.pressure undergoes reversible adiabatic expansion until the volume increases by 100 times. Calculate final temperature. (8)

 (d) State and explain Carnots theorem. Obtain the relationship between work and heat. (7)

(OR)

5 2 4 8

B.Sc. DEGREE EXAMINATION, 2008

(**APPLIED CHEMISTRY**)

(THIRD YEAR)

(**PART - III**)

(PAPER - III)

710. PHYSICAL CHEMISTRY

December] [Time : 3 Hours

Maximum : 100 Marks

*Answer ONE question from each unit.
All questions carry equal marks.*

UNIT - I

1. (a) Discuss the nature of cohessive forces in liquids. (4)

 (b) Derive Vander Waal's equation and obtain the relationships for Vander Waal's constants and inversion temperature. (8)

Turn over

(b) Write notes on :

    (i)   Brownian movement.

    (ii)   Collision frequency.

    (iii) Mean free path.   (8)

(OR)

2. (a) Derive Clausis, Berthelot and Dieterici equation of state.   (5)

  (b) Derive Maxwell's law of distribution of velocities and how it is experimentally verified.   (7)

  (c) Write notes on :

    (i)   Trouton's rule.

    (ii)   Viscosity.

    (iii) Molar volume.   (8)

UNIT - II

3. (a) Define and distinguish between physisorption and chemisorption.   (5)

  (b) Discuss enzyme catalysis and derive Michaleis-Menton complexes.   (7)

(c) State and explain the laws of photochemistry and distinguish between fluorescence and phosphoresecence. (8)

(OR)

4. (a) What are the factors influencing adsorption ? Discuss adsorption isotherms.   (7)

  (b) Define the terms catalytic promotors and poisons. Mention the applications of catalysis.   (7)

  (d) Define quantum efficiency. How is it experimentally determined ?   (6)

UNIT - III

5. (a) State and explain phase rule and give the significance of the terms present in it. (6)

  (b) Derive the equation for rate constant of first order reaction and deduce $t_{1/2}$ from it.   (7)

  (c) State and explain Le Chatelier principle. What are the factors influencing K with temperature ?   (7)

(OR)

Turn over

(b) Write notes on :

    (i)   Ostwald's dilution law.

    (ii) Kohirausch's law.   (8)

(c) Obtain the equation for *emf* of a concentration cell or an electro chemical cell.   (6)

8. (a) Obtain relationship between the volume and work done in a reversible isothermal expansion.   (6)

  (b) Discuss Hess's law and derive Kirchoff's equation.   (7)

  (c) Discuss Joule-Thomson effect. Show that it is iso - enthalpic process.   (7)

UNIT - V

9. (a) Define conductance, strong and weak elecrolytes. Discuss the effect of dilution on conductance.   (6)

  (b) How conductivity is measured ? Discuss the applications of conductivity.   (7)

  (c) Derive Nernst equation and give its significance.   (7)

(OR)

10. (a) Define ionic activity and activity co-efficient. Calculate ionic strength of 0.2 M NaCl solution at $27°$ C.   (6)

Turn over