B. PHARMACY SECOND YEAR FIRST SEMESTER - 2019
Subject : PHARMACEUTICAL CHEMISTRY - IV
(PHYSICAL)

Time: 3 hours   **Full Marks 100**

Answer any FIVE questions taking at least ONE from each group. ALL parts of a question must be answered in the same place of the answer-script.

Group A

1. (a) Show that for adiabatic expansion of ideal gas PV^γ = Constant [6
   (b) Mention the postulates of the Kinetic theory of gases. [6
   (c) Show that $C_p - C_v = R$. Define poisson ratio. [4 + 2
   (d) Define parachor. Discuss its application. [2+2

2.   (a) Write a note on the Carnot Cycle. [12
      (b) Define entropy and discuss its significance [8

3.   (a) Write a note on buffer capacity.   What is maximum buffer capacity? [6+4
      (b) Discuss different factors influencing pH of a buffer solution. [5
      (c) What is the relationship between K_a of a weak acid and K_b of its conjugate base?[5

4.   Write notes on: [4 x 5
      (i) Clausius-Clapeyron equation
      (ii) van't Hoff equation
      (iii) Parachor
      (iv) Surface tension

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Group B

5. Explain the following? Any four   20
   A. BET isotherm
   B. Difference between physisorption and chemisorptions
   C. Application of adsorption
   D. Forces acting in the interaction of colloids
   E. Preparation of colloids (different methods)

6. Explain the following with examples? 20
   A. Half –life of 1st order reaction
   B. BCS classification of drug substance based on aqueous solubility and their
      intestinal permeability
   C. Types of solvents, mechanisms with examples
   D. Solubility of liquids in liquids

7. Solve the following?   20
   A. What is the solubility of benzylpenicillin G at a pH sufficiently low to allow only
      the nondissociated form of the drug to be present?
      Given: - pKa of benzylpenicillin G = 2.76, solubility of the drug at pH 8.0 = 0.174
      mol/ dm^3
   B. Calculate the mole fraction of HCl in a solution of hydrochloric acid in water,
      containing 36 per cent HCl by weight
   C. Raoult's Law and deviation from Raoult's Law
   D. Grams of a non-electrolyte compound dissolved in 75 ml of water. The density of
      the solution is 0.779 g/mol which consists of 42.9% C; 2.4% H; 16.6% N; 38.1%
      O. If we know the boiling point increase was at 6.5°C and Kb = 20.2°C/m,
      determine the molecular formula of the compound?