Note: Answer all questions. All questions carry equal marks.

1.(a) How is liquefication of gases achieved? Explain its application in the formulation of aerosols. (8)

(b) Write a brief note on differential scanning calorimetry. (6)

OR

(c) State Gibbs phase rule. Explain the phase diagram of phenol-water system. (7)

(d) Write a note on refractive index and molar refraction. (7)

2.(a) State three laws of thermodynamics. (3)

(b) Derive an expression to determine efficiency of steam engine. (11)

OR

(c) Write in brief on free energy function and work function. (7)

(d) Explain Hess's law of constant heat summation. (7)

3.(a) State Raoult's law. Explain positive and negative deviations of Raoults law. (8)

(b) Define molarity, molality and normality and calculate these for a solution of 36% w/v of hydrochloric acid. (6)

OR

(c) Explain the concepts of activity and activity coefficients. Write the Debye-Huckel equations for determining activity coefficient. (8)

(d) What are colligative properties? Name them. Justify the choice of colligative properties in molecular weight determination. (6)

4.(a) Define buffer. Derive buffer equation for a weak acid. (9)

(b) Explain the relationship between pH and solubility. (5)

OR

(c) Explain different methods for adjusting isotonicity. (8)

(d) Write a brief note on:

i) pH indicators ii) Physiological buffer (6)

5.(a) How do you measure pH using glass electrode. (8)

(b) How do you determine pKa using potentiometry. (6)

OR

(c) Explain the application of oxidation reduction reactions in pharmacy. (9)

(d) How do catalysts act? What are different types of catalyst? (5)

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