[Time: 3 hours]   [Marks 80]

NB: 1. All questions are compulsory
       2. Figures to the right indicate full marks

1 a.	Explain in brief any two binding forces between molecules.	2
b.	State the principle of liquefaction of gases.	2
c.	What are colligative properties explain with examples	2
d.	Give one example each of a one and two component system.	2
e.	Explain the effect of temperature on solubility of gases in liquids	2
f.	Derive an expression for dissociation constant of weak electrolyte.	2
g.	Calculate the pH of; i.) 0.1 M NaOH and, ii.) 0.001 M HCl	2
h.	Explain the term surface free energy.	2
i.	What is wetting and how is it related to contact angle.	2
j.	Define Rheology and Newtonian fluids	2

2a.   State Ideal Gas equation. Explain Critical Phenomena in gases.   4
       What is the volume of two moles of an ideal gas at 25 ^{0}C and pressure of 2 atm.
       (Given R = 0.0821 atm L K^{-1} mol^{-1})

b.   Classify methods to adjust tonicity and explain any one Class in detail.   4

c.   With an example explain the effect of temperature on partially miscible liquids.   4

3a.   Define the terms dipole moment and dielectric constant. What is the   4
       significance of determination of dielectric constant?

b.   What is buffer capacity? Elaborate on pharmaceutical buffers.   4

c.   Explain surface active agents. Determine the HLB of polyoxyethylene sorbitan   4
       monolaurate having saponification value of 45.5 and acid value of 276.

4a.   Explain in detail deviations from Raoult's law. **OR** Explain azeotropic mixtures   4
       in detail.

b.   State Distribution Law. Discuss its applications.   4

c.   What are acidic buffers? Derive Henderson Hasselbalch equation for acetic acid   4
       and sodium acetate buffer.

5a.   Define amorphous and crystalline solids. Write a note on polymorphism.   4

b.   What is an adsorption isotherm? Discuss Langmuir adsorption isotherm in   4
       detail.

c.   Define the following i) Plastic flow
                            ii) Dilatant flow
                            iii) Pseudoplastic flow
                            iv) Thixotropy

6a. Give the applications of liquid crystalline phase and supercritical fluid phase in pharmacy. 4

  b. Define interfacial tension. Explain any one method for determination of interfacial tension. 4

  c. What are non-Newtonian systems? Explain any one method for determination of viscosity of non-Newtonian liquids. 4