

[Time: 3 Hours]

[Marks:80]

Please check whether you have got the right question paper.

- All questions are compulsory.
- Figures to the right indicate full marks.

- Q.1
- What are Vander Waal's intermolecular forces. 2
 - Define the terms vapor pressure and boiling point. 2
 - Define additive and colligative properties with examples. 2
 - State phase rule and explain degrees of freedom. 2
 - How do pressure and temperature affect the solubility of gases in liquids? 2
 - Differentiate between strong and weak electrolytes. 2
 - Calculate the pH of; i. 0.05 M NaOH and, ii., 0.0005 M HCl 2
 - Define the terms surface tension and surface free energy. 2
 - Explain the terms wetting and contact angle. 2
 - Define the terms dynamic viscosity and viscoelasticity. 2
- Q.2
- What are ideal and real gases? One mole of diethyl ether occupies 15 liters at 227°C. Calculate the pressure if Van der Waal's constants for diethyl ether are $a = 17.38 \text{ atm.lit}^2 \text{ mol}^{-2}$, and $b = 0.134 \text{ lit.mol}^{-1}$. (Given: $R = 0.0821 \text{ lit.atm.K}^{-1} \text{ mol}^{-1}$) 4
 - What are isotonic solutions? Explain any one class I method to adjust tonicity. 4
 - Explain the effect of temperature on partial miscibility of liquids with suitable example. 4
- Q.3
- What is optical rotation? Explain the working of polarimeter. 4
 - What is buffer capacity? Write a note on buffers used in pharmaceutical system. 4
 - Write a note on surface active agents. If the saponification value and acid value of a surfactant are 55 and 70.2 respectively, calculate its HLB. Also comment on the nature of the surfactant. 4
- Q.4
- Define Raoult's law and differentiate between ideal and real solutions. **OR** Write a note on azeotropic mixtures. 4
 - State and explain Distribution Law. Mention the modifications of the law for weak electrolytes. 4
 - Derive Henderson Hasselbalch equation for a buffer comprising acetic acid and sodium acetate. 4
- Q.5
- What is polymorphism? With suitable examples explain pharmaceutical significance of polymorphs and amorphous solids. 4
 - Define adsorption isotherm. Derive equation for Langmuir adsorption isotherm. 4
 - Draw rheograms for non-newtonian systems and explain any one in detail. **OR** What do you understand by thixotropy? State its significance. 4
- Q.6
- Write a note on liquid crystalline state. 4
 - Enlist methods to determine surface tension and explain any one in detail. 4
 - What are the different viscometers available to measure viscosity of newtonian and non-newtonian liquids? Explain the principle and working of any one. 4
