

[Time: 3 Hours]

[ Marks: 80]

Please check whether you have got the right question paper.

N.B: 1. All questions are compulsory.

1. a) Mention any two attributes for formation of hydrogen bond. **02**  
 b) State what is meant by 'Polymorphism'? **02**  
 c) Explain additive properties with examples. **02**  
 d) Define 'Phase' and 'Components' with regards to Phase Rule. **02**  
 e) What is the effect of pressure on solubility of gases in liquids? **02**  
 f) What are strong electrolytes? Give examples. **02**  
 g) If the pH of a solution is 4.72. What is the hydronium ion concentration? **02**  
 h) What is meant by 'Surface free energy'? **02**  
 i) Explain the term contact angle. **02**  
 j) What are Newtonian fluids? Give suitable examples. **02**
2. a) What are Real Gases? **04**  
 Two moles of ammonia are enclosed in a four liter flask at 30°C. Calculate the pressure exerted by the gas assuming it behaves like a real gas.  
 (Given:  $R = 0.082 \text{ atm. L. k}^{-1} \text{ mol}^{-1}$ ,  $a = 4.14 \text{ lt}^2 \text{ atm mol}^{-1}$ ,  $b = 0.037 \text{ L. mol}^{-1}$ )  
 b) Classify the methods to adjust isotonicity and explain any one in detail. **04**  
 c) Discuss the effect of temperature on miscibility of phenol-water system. **04**
3. a) Give an account of applications of dipole moment. **04**  
 b) Define buffers. Derive the buffer equation for an acidic buffer. **04**  
 c) State Gibb's Adsorption equation for soluble monolayers. **04**  
 Calculate HLB value of a surfactant having sap value of 45.5 and acid value of 276.
4. a) State Raoult's Law and explain deviations from Raoult's Law. **04**  
**OR**  
 Discuss Azeotropic Mixtures.  
 b) State Distribution Law and give its limitations. **04**  
 c) Define pH and explain in detail method to determine pH. **04**
5. a) Describe in detail Linde's method for liquefaction of gases. **04**  
 b) Define 'adsorbent' and 'adsorbate'. Elaborate on Langmuir adsorption isotherm equation. **04**  
 c) Name non-newtonian systems and explain any one in detail. **04**  
**OR**  
 Discuss the term thixotropy and give its significance.
6. a) Discuss in detail Liquid Crystalline state. **04**  
 b) Discuss Drop number method to determine surface tension. **04**  
**OR**  
 Describe Du Nuoy Tensiometer to determine Interfacial Tension.  
 c) Elaborate on any one method for measurement of flow for Newtonian systems. **04**