1. Write a structural formula for each of the following compounds (15%):
(a) 2,3,4-Triethyldecane, (b) Isohexyl chloride,
(c) Glycerin (d) *tert* -Butyl iodide,
(e) 4-Isopropylnonanone

2. Give IUPAC substitutive names for all of the isomeric alcohols with the formulas. (20%)
(a) $C_4H_{10}O$ and (b) $C_5H_{12}O$

3. You want to make a buffer with a pH of about 6 which one of the following conjugated acid-base pairs would you use? Explain. (10%)
(a) H_3PO_4 - $H_2PO_4^-$ (Ka $H_3PO_4 = 7.5 \times 10^{-3}$)
(b) H_2CO_3 - HCO_3^- (Ka $H_2CO_3 = 4.2 \times 10^{-7}$)
(c) NH_4^+ - NH_3 (Ka $NH_4^+ = 5.6 \times 10^{-10}$)

4. Describe the alternative definitions of acids and bases on the basis of Arrhenius, Bronsted-Lowry and Lewis concepts, respectively. (10%)

5. Please explain the relationship between intermolecular forces and the solubilities. (10%)

6. Please make an example describe what is (i) adenine, (ii) nucleotide, (iii) nucleoside, respectively. (15%)

7. Describe how the primary, secondary, tertiary, and quaternary structures of a protein differ. (20%)