

## General Chemistry

- Which of the following alkenes can exist as cis-trans isomers? Write their structures. (20%)  
(a)  $\text{CH}_2=\text{CHCH}_2\text{CH}_3$                       (b)  $\text{CH}_2=\text{C}(\text{CH}_3)_2$   
(c)  $\text{CH}_3\text{CH}=\text{CHCH}_3$                       (d)  $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCl}$
- Using the symbol R, write a general formula for (a) a primary alcohol, (b) a secondary alcohol, and (c) a tertiary alcohol. (15%)
- Describe how the primary, secondary, tertiary and quaternary structures of a protein differ. (15%)
- Describe the alternative definitions of acids and bases on the basis of Arrhenius, Bronsted-Lowry and Lewis concepts, respectively. (15%)
- Please give an example describe what is (1) Adenine, (2) Nucleotide, (3) Nucleoside, respectively. (15%)
- Write a structural formula for each of the following compounds. (10%)  
(1) Acetamide, (2) Formic acid, (3) Acetone, (4) Glycerin, (5) Phenol
- Which amines shown as follows are (a) primary, (b) secondary, (c) tertiary amines? Please also give an IUPAC name for these amines, respectively. (10%)  
(1)  $(\text{CH}_3)_2\text{CHNHCH}_3$ , (2)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_2\text{NCH}_3$ ,  
(3)  $(\text{CH}_3)_2\text{CHNH}_2$ , (4)  $(\text{CH}_3)_2\text{NH}$ , (5)  $(\text{C}_2\text{H}_5)_3\text{N}$