

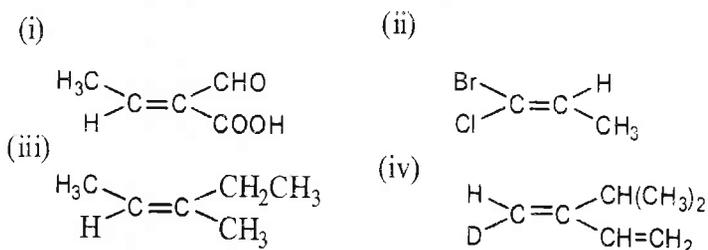
Bago University
Department of Chemistry
Second Semester Examination, September 2019

Third Year
(Chemistry Specialization)
Answer any six Questions

Chem 3109
Organic Chemistry IV
Time Allowed: (3) hours

1. (a) Fill in the blanks with the correct word(s), unit(s), and etc., as necessary.
- (i) In aqueous basic solution, the zwitterion can _____ a proton to form an anion.
 - (ii) Mirror image isomers are called _____.
 - (iii) In aqueous acid solution, an amino acid in zwitterion form can accept a proton to yield a _____.
 - (iv) An asymmetric carbon is also known as a _____.
 - (v) Mild enzyme-catalyzed hydrolysis cleaves a _____ into monomeric building blocks called nucleotides.
 - (vi) A meso compound is an _____ molecule.
- (b) Select the correct statement(s), word(s), unit(s) and etc., given in the followings.
- (i) (S, R, Z) sodium lactate is dextrorotatory.
 - (ii) An asymmetric carbon is a carbon atom that is bonded to (two, three, four) different groups.
 - (iii) (Enantiomers, Diastereomers, Mesocompounds) have different physical and chemical properties.
 - (iv) The technique of (electrophoresis, paper chromatography, ion- exchange chromatography) separates amino acids on the basis of polarity.
 - (v) A polyamide with fewer than (25, 50, 75) amino acid residues is classified as a peptide.
 - (vi) (Glycoproteins, Lipoproteins, Nucleoproteins) contain a carbohydrate part.

2. (a) Assign (E) or (Z) to each of the following molecules.



- (b) Which of the following compounds represents a chiral molecule?
(i) 2- bromobutane (ii) 1- chloropropane (iii) 2,4- dimethyl pentane (iv) 4- octanol
- (c) Explain the following terms.
(i) Mesocompound (ii) Dextrorotatory (iii) Optically inactive

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3. (a) Sketch the structures of (E) and (Z) isomers for 2,3-dichloro-2-butene, 2-hexene and 4-chloro-3-heptene.
(b) Compare the stability of cis-1,4-dimethylcyclohexane and its trans isomer.
4. (a) How many maximum numbers of stereoisomers are there in 3-chloro-2-butanol? Draw the structures of these isomers. Indicate which are enantiomers and which are diastereomers.
(b) Draw the structures of cis and trans isomers for 2-methyl-3-heptene, 1,2-dimethylcyclopentane and 1-bromo-4-chlorocyclohexane.
5. (a) Define isoelectric point of an amino acid.
(b) Draw the following amino acids in their zwitterionic forms.
(i) glycine (ii) leucine (iii) phenylalanine
(c) Classify amino acids according to polarity of side chain.
6. (a) Show how you could prepare these α -amino acids starting from the appropriate carboxylic acids.
(i) Valine (ii) Phenylalanine (iii) Leucine
(b) Predict the products of the reaction of glycine with
(i) dilute HCl (ii) nitrous acid (iii) acetic anhydride
7. (a) What are globular proteins? List some examples of globular proteins.
(b) Illustrate the formation of peptide bond from alanine and glycine.
(c) What smallest fragments would result from the complete hydrolysis of DNA and RNA?
