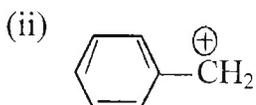
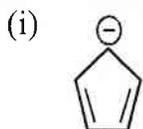


Bago University
Department of Chemistry
First Semester Examination, March 2019

Third Year B Sc
(Chemistry Specialization)
Answer (any six) Questions

Chem-3103
Organic Chemistry III
Time allowed (3) hours

1. (a) Fill in the blanks with the correct word(s), unit(s), and etc., as necessary.
- (i) In a chemical reaction, the reactant molecule undergoing attack is referred to as the -----.
 - (ii) The reagents that are nucleus loving in character are referred to as -----.
 - (iii) Carbocations are also stabilized by the ----- system.
 - (iv) ----- is a measure of how readily the nucleophile attacks a hybridized carbon bonded to a leaving group.
 - (v) The ----- the basicity of a group, the better is its leaving ability.
 - (vi) A steric effect that decreases reactivity is called -----.
- (b) Select the correct statement(s), word(s), unit(s) and etc., given in the followings.
- (i) (Carbanions, Carbocations, Radicals) have a negatively charged carbon.
 - (ii) (SO_3 , NO_2^+ , $\bar{\text{C}}\text{N}$) is a nucleophile.
 - (iii) The carbocation is a group of atoms that contains a carbon atom bearing only (six, seven, eight) electrons.
 - (iv) If an elimination reaction removes two substituents from the same side of the bond, the reaction is (anti elimination, syn elimination, Walden inversion).
 - (v) (Basicity, Nucleophilicity, Acidity) is a measure of how readily a compound is able to attack an electron-deficient atom.
 - (vi) (Protic solvents, Aprotic solvent, Organic solvent) contain a hydrogen bonded to an oxygen or nitrogen, so they are hydrogen bond donors.
2. (a) The acidity of phenol is stronger than benzyl alcohol. Give reasons for this statement.
- (b) Write down the delocalized structures of the following compounds and ions in their classical and non-classical forms.

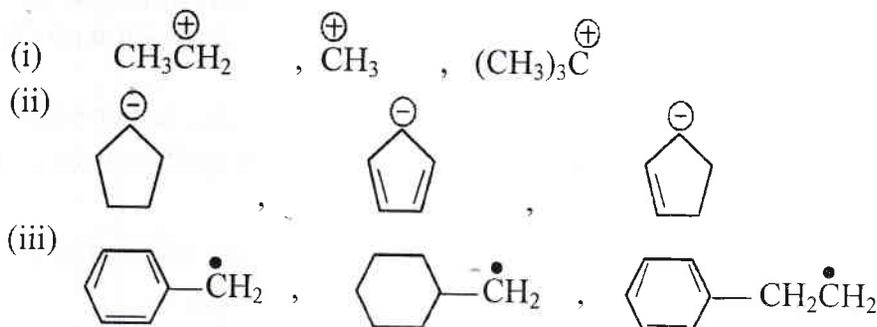


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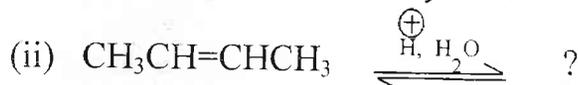
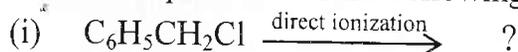
3. (a) Explain the followings;

(i) Mesomeric effect (ii) Electrophilic reagent (iii) Hyperconjugation

(b) Rank the following in order of their stability and give reasons for your answer.



4. (a) Predict the products for the following reactions.



(b) Discuss briefly on the stabilities of carbanions.

5. (a) Which reagent in each pair will react faster in an $\text{S}_{\text{N}}2$ reaction with hydroxide ion? Give reasons.

(i) CH_3Br , CH_3I (ii) $(\text{CH}_3)_3\text{CCl}$, CH_3Cl (iii) $(\text{CH}_3)_2\text{CHBr}$, $\text{CH}_3\text{CH}_2\text{Br}$

(b) Indicate whether each of the following solvents is *protic* or *aprotic*.

(i) NH_3 (ii) $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$ (iii) $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ (iv) $\text{CH}_3\text{CH}_2\text{OH}$

6. (a) Distinguish between substitution reactions ($\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$) summarily.

(b) The $\text{E}2$ reaction is regioselective and stereoselective. Explain this statement with suitable examples.

7. (a) Determine whether the following substitution reactions will take place by $\text{S}_{\text{N}}1$ or $\text{S}_{\text{N}}2$ pathway. Give the configuration of the product formed in each reaction.



(b) Account briefly on the stereochemistry of an $\text{E}1$ reaction by giving an appropriate example.
