

**KABARAK**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**2009/2010 ACADEMIC YEAR**

**FOR THE CERTIFICATE OF PRE-UNIVERSITY CHEMISTRY**

**COURSE CODE: PCHEM 021**

**COURSE TITLE: BASIC ORGANIC CHEMISTRY**

**STREAM: SEMESTER TWO**

**DAY: THURSDAY**

**TIME: 9.00 – 11.00 A.M.**

**DATE: 12/08/2010**

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**INSTRUCTIONS:**

- Answer all questions: (70 % Marks)

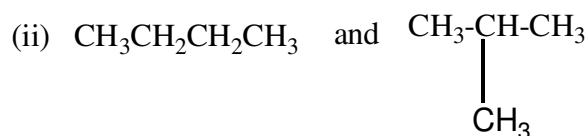
**PLEASE TURN OVER**

1. (a) Define the following terms used in organic chemistry:

- (i) Hydrocarbons (ii) Isomer (iii) Alkyl group (iv) Halogenation  
(v) Unsaturated hydrocarbons. (2.5 marks)

(b) Draw the shapes of the following compounds: (i) Methane (ii) Ethene  
(iii) Ethyne. (3 marks)

(c) (i) Explain why alkanes, alkenes and alkynes have generally low boiling points and melting points compared to other organic compounds?



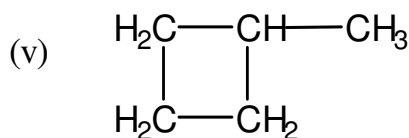
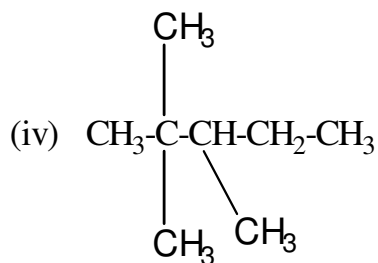
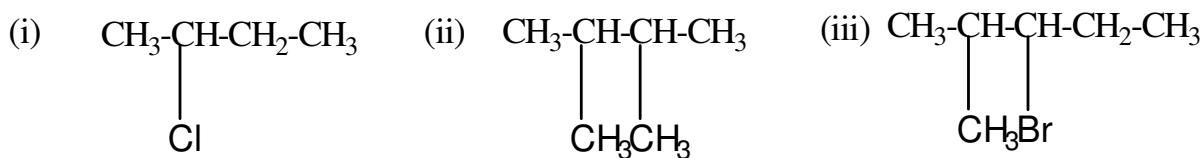
are isomers of butane, which one will have higher boiling point? Explain your answer. (6 Marks)

(d) (i) What does “Cis” and “Trans” means?

(ii) Draw the Cis and Trans structures for the compound  
2,3-dibromo-2-butene. (6 Marks)

2. (a) Write structural formulas for the Isomers of an alkene with general formula  $\text{C}_5\text{H}_{10}$ . (3.5 marks)

(b) Give the IUPAC names for the following compounds of Hydrocarbons: (7.5 marks)



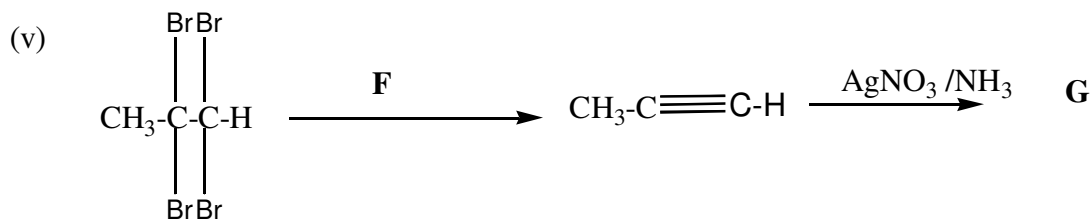
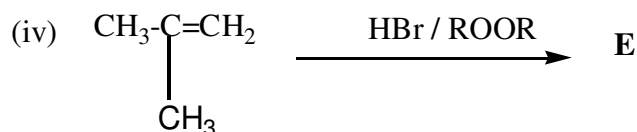
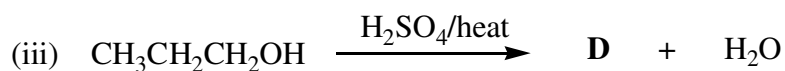
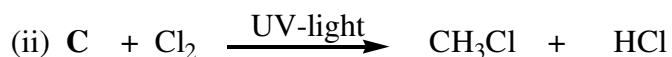
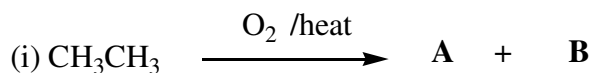
(c) . Write the structures for the each of the following compounds:

- (i) 5- methyl-2-hexene (ii) cyclobutene (iii) 2,4,5-trimethyl-5-nitro-2-heptene.

Write the structural formula for each of the following compounds:

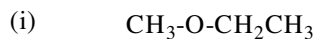
- (a) 1-bromo-4,5-dimethyl-2-hexyne (b) 4-nitro-hep-2-yne. (7.5 marks)

3. (a) Give the missing Reactant(s) / Product(s) / Reagent(s) in the following reaction equations: (7 Marks)

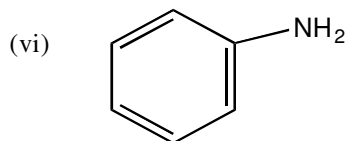
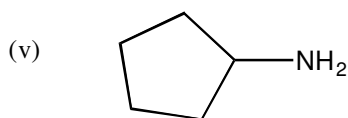
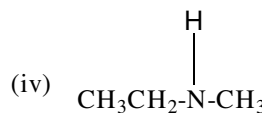
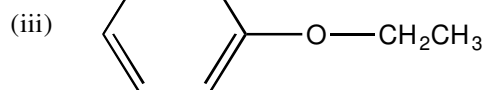
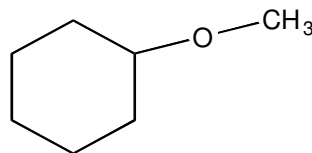


- (b) (i) Explain why  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  has a higher boiling point than  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ ?  
 (ii) Write the structures and IUPAC names for all possible isomers of an alcohol with the following formula  $\text{C}_4\text{H}_9\text{OH}$ ?  
 (iii) Write the structures of the following alcohols: (i) 2-butanol  
 (ii) 2-methyl-2-propanol (iii) cyclohexanol. (10.5 marks)

4. (a) Name the following ethers and Amines: (6 marks)



(ii)



(b) Write the structures of the following aldehydes and ketones:

(i) 2-methylbutanal (ii) benzaldehyde (iii) 2-pentanone

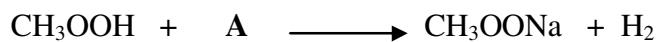
(iv) 3-methoxyhexane

(4 marks)

(c) (i) Explain why carboxylic acids have higher boiling point than alcohols?

(ii) Write structures for the following acids: 2-methylpropanoic acid,  
3-bromobutanoic acid and *p*-nitrobenzoic acid

(iii) Complete the following reactions by giving the missing reactant or product or reagent:



(7.5 Marks)