



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY SPECIAL/SUPPLEMENTARY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN APPLIED CHEMISTRY

ACH 4105: ORGANIC CHEMISTRY I

SPECIAL/ SUPPLIMENTARY EXAMINATIONS

SERIES: SEPTEMBER 2018

TIME: 2HOURS

DATE: Pick Date Sep 2018

Instructions to Candidates

You should have the following for this examination

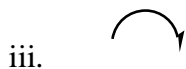
-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

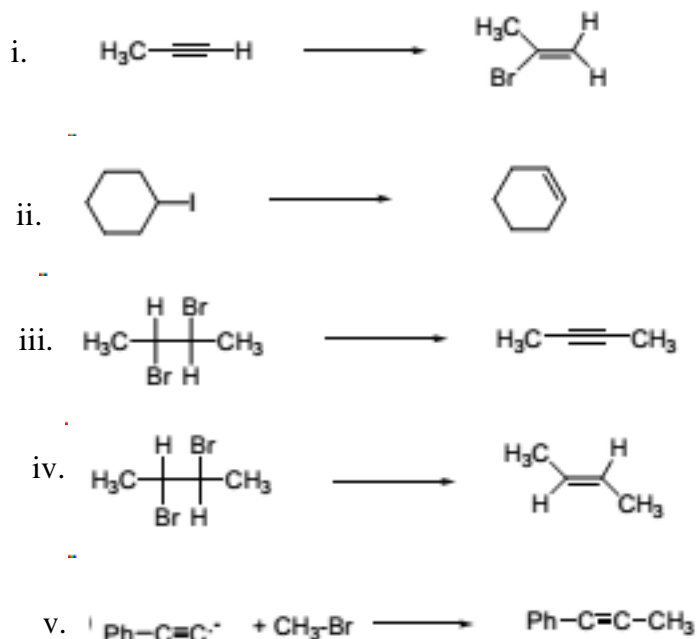
Do not write on the question paper.

Question ONE

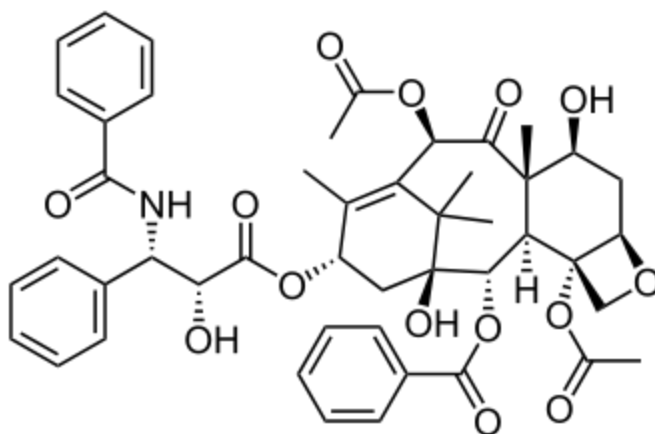
(a) Explain in a simple sentence what is meant in a chemical sense by the following arrows. [5 marks]



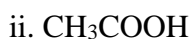
(b) Classify each of the following reactions as either Elimination, Addition or Substitution. [5 marks]



(c) Taxol (Structure shown below) is a highly derivatized diterpenoid which is an anti-tumor agent in breast and ovarian cancers. Trace the structure, circle and name the functional groups present in the molecule. [7 marks]

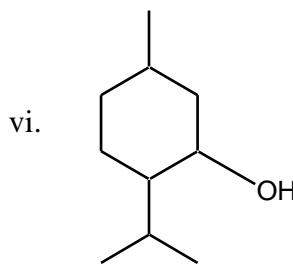
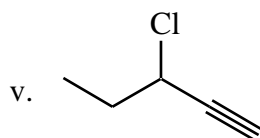
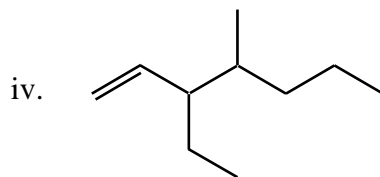
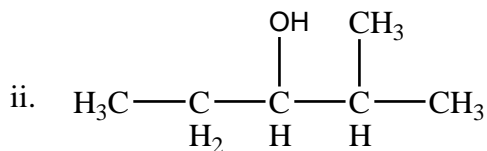
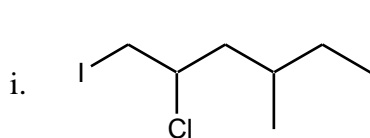


(d) Draw Lewis structures (sticks for bonds, and dots for lone pairs of electrons) for the following molecules and label the hybridization of all the carbon and oxygen atoms in each case. [7 marks]



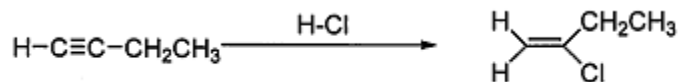
(e) Provide the IUPAC names for the following organic molecules

[6 marks]



Question TWO

(a) Make use of curly arrows to provide the reaction mechanism for the following electrophilic addition reaction. [5 marks]



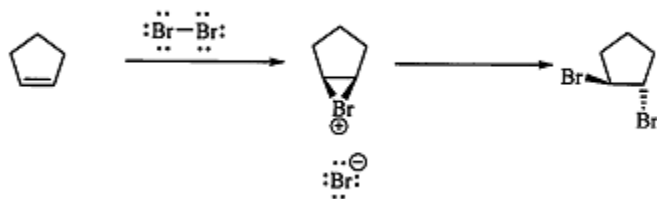
(b) Give the reagents and or products for the following reactions. [9 marks]



(c) Make use of curly arrows to provide the reaction mechanism for the following anti addition

mechanism of cyclic alkene.

[6 marks]

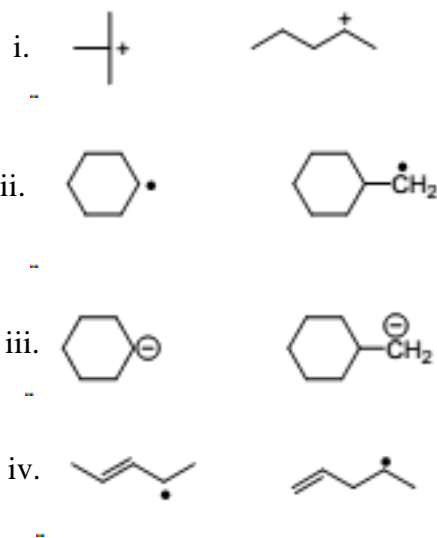


Question THREE

(a) Convert the following condensed formulae of organic molecules to the corresponding bond-line structures and indicate the unsaturation index for each molecule. [6 marks]



(b) Identify the more stable member of each pair of the following radicals/carbocations and account for your choice. [8 marks]



(c) Explain the following observations;

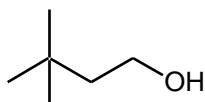
- Paraffin is immiscible with water [3 marks]
- Ethanol is miscible with water in all proportions whereas 1-hexanol is only slightly miscible. [3 marks]

Question FOUR

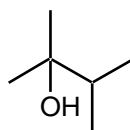
(a) i. What is the difference between structural isomers and stereoisomers? [2 marks]

ii. Draw line bond structures and provide IUPAC name of four constitutional isomers of alcohols with molecular formula C_4H_9OH . [6 marks]

(b) Explain how you would use $ZnCl_2/HCl$ aqueous solution to differentiate between the following samples of alcohols: - [3 marks]



A



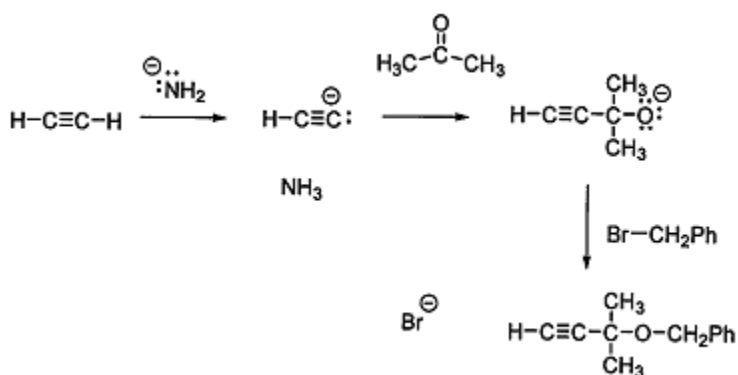
B

(c) Explain why solubility of alcohols decreases down the homologous series. [2 marks]

(d) Provide the dehydration products of the alcohols A and B in (b) above, and provide the IUPAC name of each product clearly indicating major product where applicable. [7 marks]

Question FIVE

(a) Make use of curly arrows to show the mechanism of the following reaction. [7 marks]



(b) Arrange the following compounds in increasing order of reactivity toward S_N2 displacement reaction and account for your answer. [4 marks]

2-bromo-3-methylbutane, 1-bromo-3-methylbutane, 2-bromo-2-methylbutane

(c) State and explain three factors that influence the rate of S_N1 reactions in alkyl halides. [9 marks]