

KISII UNIVERSITY
UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF
THE DEGREE OF BACHELOR OF EDUCATION (SCIENCE)
SECOND SEMESTER 2015/2016
(JANUARY-APRIL 2016)

CHEM 130: ORGANIC CHEMISTRY I.

STREAM: Y1S2

TIME: 2 HOURS

DAY: WEDNESDAY 09.00 – 11.00

DATE: 06/04/2016

INSTRUCTIONS

1. Do not write anything on this Question paper.
2. Answer Question One And Any Other Two Questions.

SECTION A: marks 40%

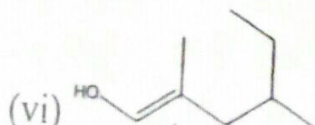
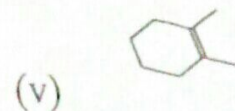
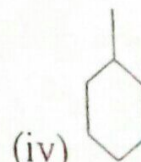
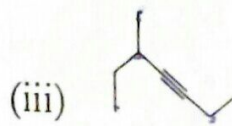
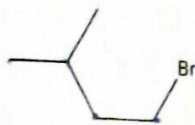
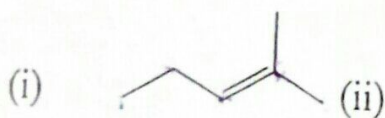
1. Write the structural formula of each of the following compounds:

- (i) 4-ethyl-2,3-dimethylhexane (ii) 5, 4- dibromo-1-chloro-2- pentyne
(iii) Trans-1, 2- dimethylcyclopropane (iv) Cis-1, 2-dimethylcyclopropane
(v) 2, 3, 4-trimethyl-2-penten-1-ol (vi) bicyclo (3, 2, 0)heptane

(6marks)

2. Give the IUPAC name for each of the following compounds:

(6 marks)



3. Explain the following terms:

(i) Homologous series (ii) Aromatisation (iii) Hybridization (iv) Catenation (v) Polymerization
(vi) isomerisation

(6marks)

4 (a) Distinguish between position and branch isomerism.

(2 mks)

(b) Which of the two isomers, trans-cyclobutane and Cis-cyclobutane is more stable?

Explain your answer.

(1 mks)

(c) Draw and give the IUPAC name of all isomers of heptyne (C_7H_{12})

(3mks)

5. Explain the following observations:

(i) Alcohols have higher boiling points than aldehydes of corresponding molecular size (2 mk)

(ii) Boiling point of alkanes increase with increase in carbon atoms.

(2 marks)

(iii) Alkenes exhibit geometric isomerism while aliphatic alkanes do not.

(2 marks)

6. Write structural formula for each of the following compounds:

(4mks)

(i) 1, 4- dimethyl -2-cyclobutene.

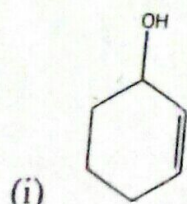
(ii) 2-bromo bicycle (3, 2,2) nonane

(iii) 2-bromo- 3-methyl-1-hexen-1-ol

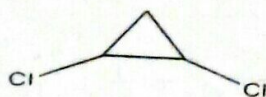
(iv) 2, 5- heptadiyne

7. Give the IUPAC name for each of the following compounds:

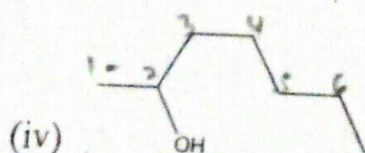
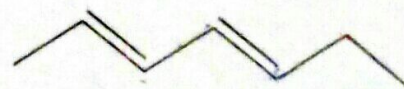
(6mks)



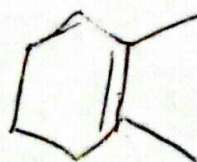
(ii)



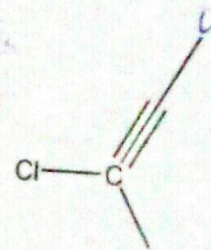
(iii)



(v)



(vi)

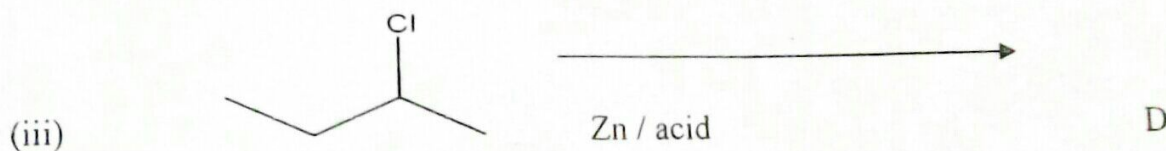
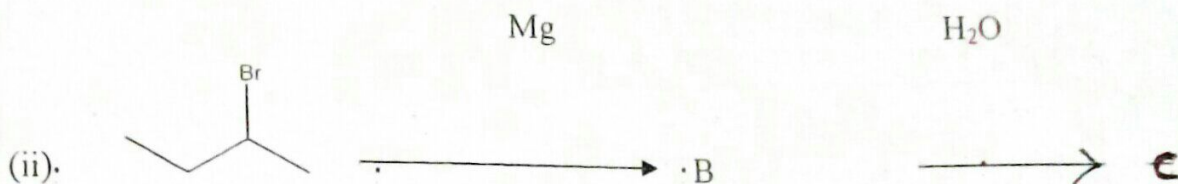
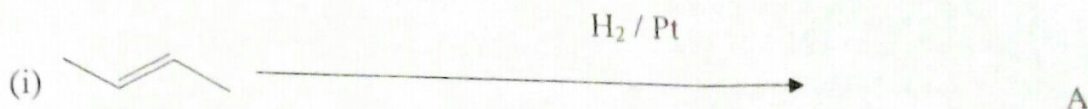


SECTION B: (30 Marks)

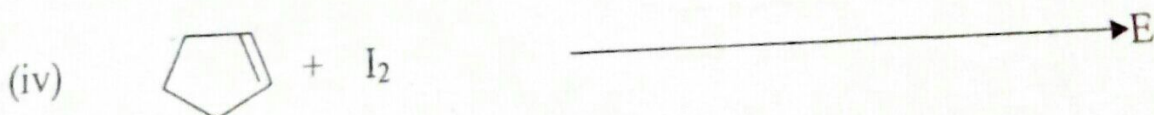
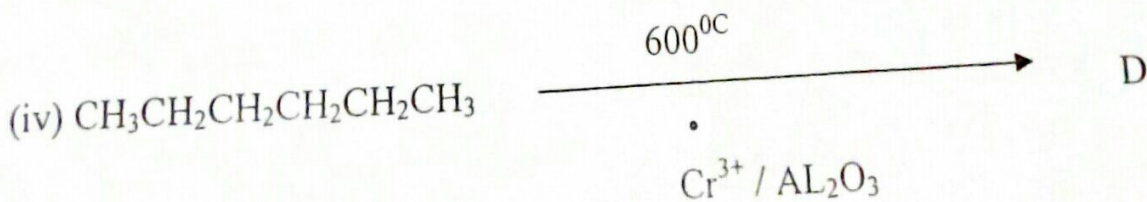
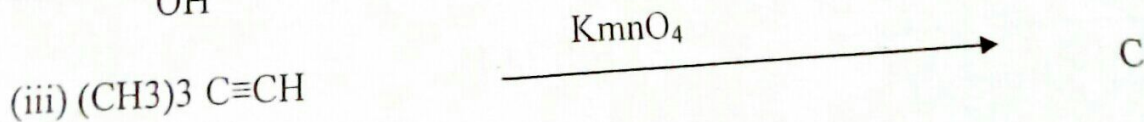
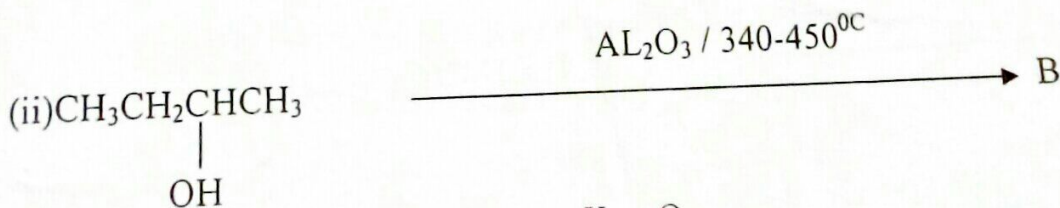
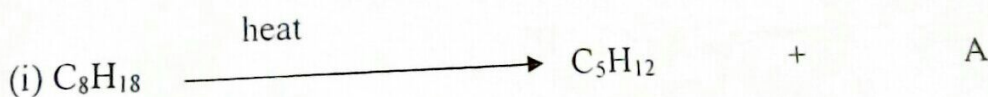
Attempt **two** questions.

8(a). Give the final structure of compound formed under conditions given.

(5 mks)



(b) Give the structure of major organic product (s) in each of the following reactions :(5 marks)

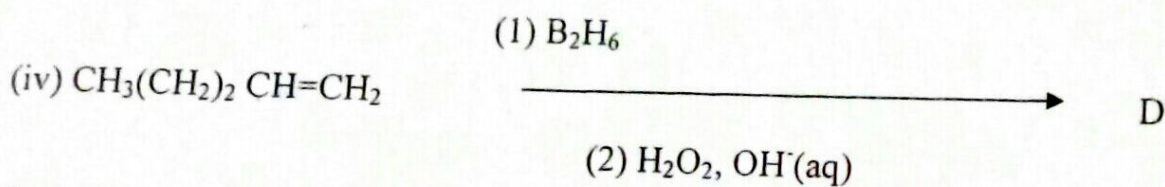
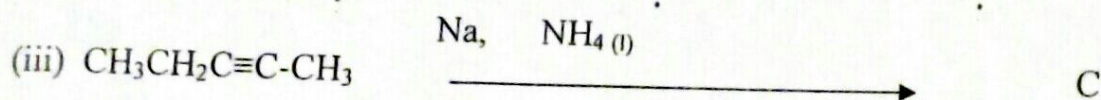
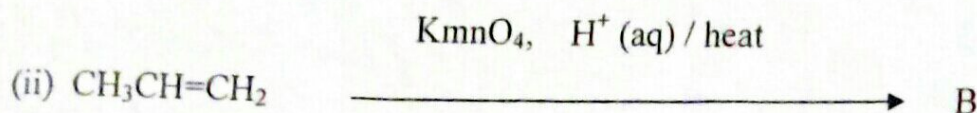
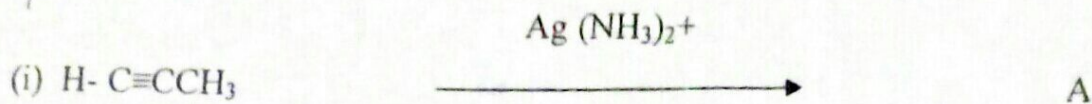


(c) Explain the following terms:

- (i) Electrophile (ii) nucleophile (iii) Cyclisation (iv) thermal cracking (v) halogenation

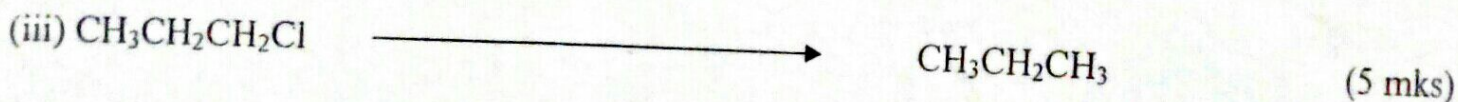
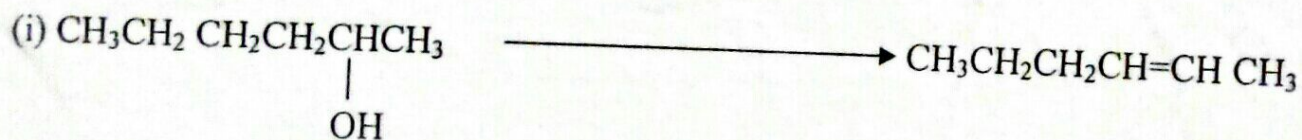
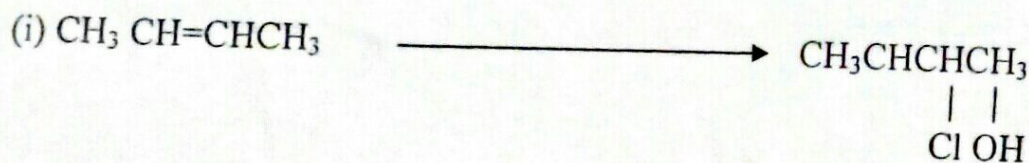
(5marks)

Q10(a) Draw the structure of the major organic product(s) in each of the following reactions:

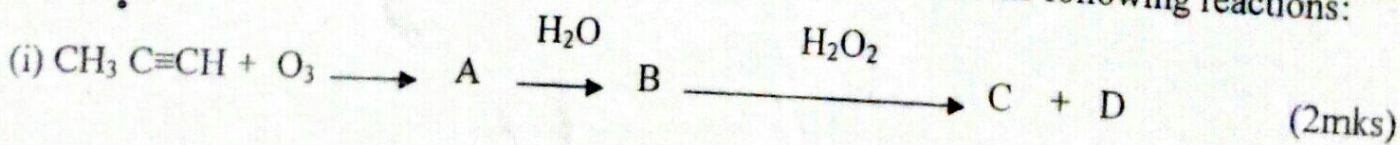


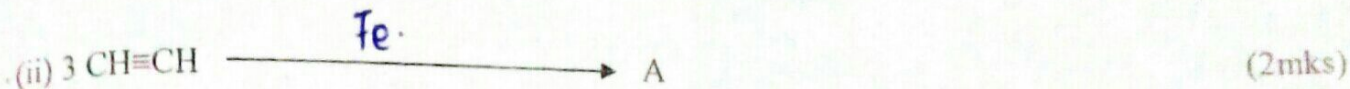
(6mks)

(b) Give the reagent and conditions required for each of the following transformations:



(c) Give the structure of the major organic product (s) in each of the following reactions:

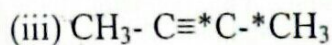
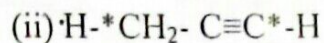
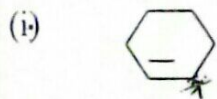




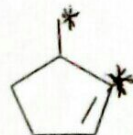
10. (a) Give the final structure of the compounds formed under conditions given. Explain the role of light in the initiation step.



(a) Indicate the hybridization of the carbon marked with asterisk (*) in each of the following compounds:



(iv)



(5 marks)

(b) Differentiate between SP^3 and SP^2 orbitals

(2 marks)

(c) On analysis, an organic compound was found to contain 73.3% Carbon, 3.8% hydrogen, 10.7% Nitrogen and oxygen respectively. The relative molecular mass of the compounds was 262. (R.A.M.: C=12, H=1, N=14, and O=16)

(i) Distinguish between empirical and molecular formula

(2mks)

(ii) Find the empirical formula of the compound.

(3mks)

(iii) Determine the molecular formula of the compound.

(1mks)