

KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2009/2010

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE

HML 110: ORGANIC CHEMISTRY FOR MLS

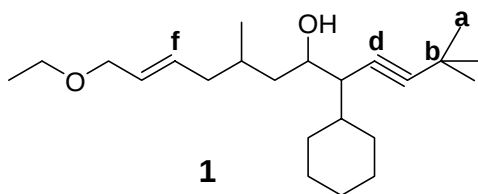
DATE: Tuesday 29th December 2009

TIME: 2.00pm -4.00pm

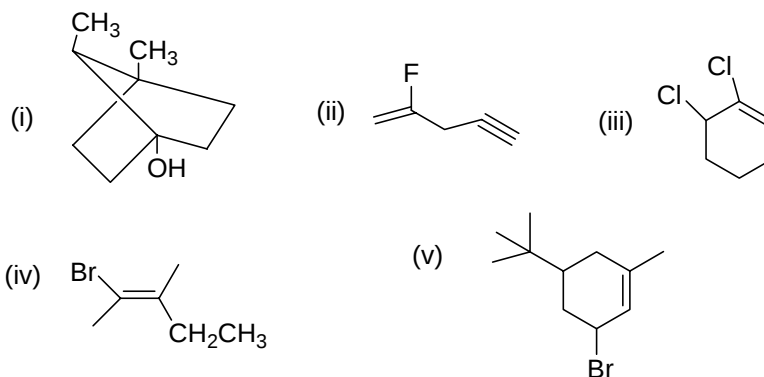
INSTRUCTIONS:

Answer all Questions

Q1. (a) You are provided with the following structure of an organic compound **1**.



- (i) Draw and label all the functional groups in compound **1**. (2 mks)
- (ii) Indicate type of hybridization for carbon atoms labeled **b** and **f**. (2 mks)
- (iii) Which of the labeled carbon atoms would you classify as tertiary and quaternary? (2 mks)
- (b) Provide systematic (IUPAC) names for the following compounds, indicating stereochemistry where appropriate. (6 mks)



(c) Draw the structure of each of the following compounds including the stereochemistry where appropriate. (6 mks)

- 5-Bromo-2-methyl-3-heptyne
- 5-chloro-1-methyl-5-(isopropyl)cyclohex-1-ene
- trans-2-bromocyclobutanol
- (E)-2-methyl-1,5-octadiene

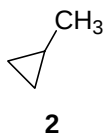
Q2. (a) Quantitative analysis of quinone showed the presence of carbon, hydrogen, and oxygen. Combustion of 0.105 g of the quinone gave 0.257 g of CO_2 and 0.035 g of H_2O . If the molecular mass of the quinone is 108g. Calculate

- Empirical formula of the quinone
- Molecular formula of the quinone

[C = 12.01, H = 1.00, O = 15.99] (7 mks)

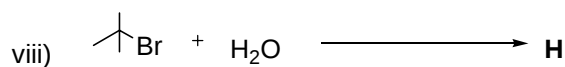
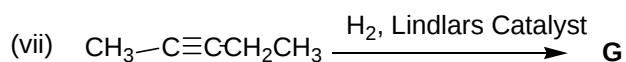
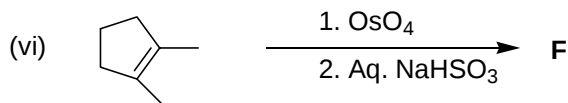
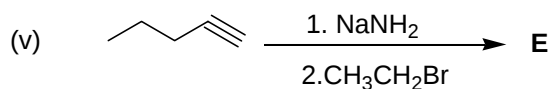
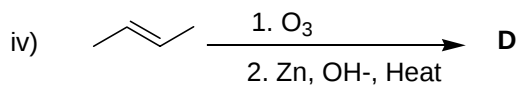
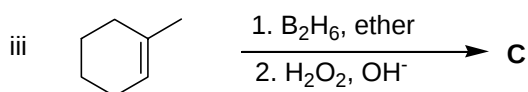
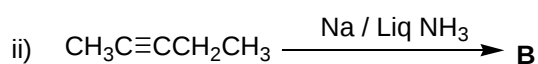
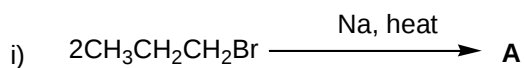
(b) Draw the structural formulas and give names of any three isomeric compounds with the molecular formula $\text{C}_3\text{H}_6\text{O}$. (6 mks)

(c) Monobromination of methylcyclopropane (2) with molecular bromine in presence of light gives three brominated products, with one predominating over the others.

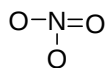


- i. Draw possible monobrominated isomers of the reaction. (3 mks)
- ii. Which of the compound in (i) above would predominate over the others? (1mk)

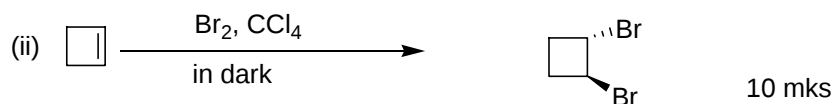
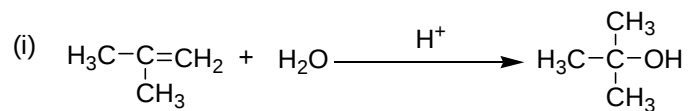
Q3. (a) Provide the structure(s) of the major organic compounds that are expected in the following reactions. Indicate the stereochemistry where necessary. (16 mks)



(b) Determine the formal charge for each atom and the ionic charge for the following. (4 mks)
[N = 5, O = 6]



- Q4.** (a) Using curly arrows show the movement of electrons in the following reactions.



- (b) Give a simple visual chemical test you would perform to differentiate between the pairs of the compound below. Explain what happens in each case. (5 mks)

