BONDO UNIVERSITY COLLEGE

UNIVERSITY EXAMINATION 2012/2013

1ST YEAR 2ND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE(CONSTRUCTION MANAGEMENT (REGULAR)

COURSE CODE: SCH 3121
TITLE: ORGANIC CHEMISTRY
DATE:5/12/2012 **TIME: 8.00-10.00AM**
DURATION: 2HOURS

INSTRUCTIONS

1) **This paper contains FIVE [5] questions.**
2) **Answer question ONE [1] COMPULSORY and ANY other TWO [2] questions.**
3) **Write ALL answers in the booklet provided.**

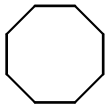
Section A This section contains ONE COMPULSORY question

QUESTION 1

(a) Give **FOUR** features of a homologous series. (4 marks)

(b) Give the IUPAC names of the following compounds; (10 marks)

(i) C_4H_{10} (ii) $CH_3\text{-}CH_2\text{-}CH=CH\text{-}CH_3$ (iii) $CH_3\text{-}CH\text{-}C\equiv C^-Li^+$ (iv) 

(v) $CH_3\text{-}CH_2\text{-}CH_2\text{-}C(CH_3)_2Br$ (vi) $HOOC\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}COOH$ (vii) 

(viii) $CH_3\text{-}CH_2\text{-}CH(OH)\text{-}CH_3$ (ix)  (x) $CH_3\text{-}(CH_2)_5\text{-}$ 

(c) Draw the structures of the compounds given below; (10 marks)

(i) Cyclobutane
(ii) Unidecane
(iii) Pentan-2-one
(iv) Tertbutylalcohol
(v) 2-propanol

(d) Hydration of 2-methylprop-1-ene is said to be regiospecific. Explain using equations. (6 marks)

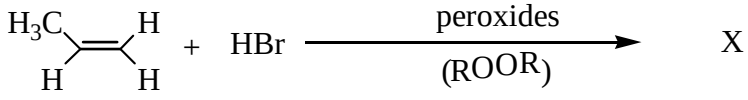
Section B: This section contains FOUR questions. Answer ONLY TWO questions.

QUESTION 2

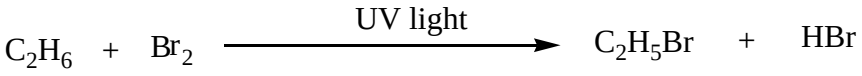
(a) Using mechanism, distinguish between *homolytic* and *heterolytic* bond cleavage. (3 marks)

(b) Carbon is said to be a unique element. Discuss this fact giving four counts. (8 marks)

(c) Draw the structure of compound X, and give the reaction mechanism. (5 marks)



(d) For the reaction of methane with chlorine;



Name (i) the type of mechanism. (½ mark)

(ii) the type of bond fission involved (½ mark)

(e) Illustrate the reaction mechanism. (3 marks)

QUESTION 3

3. (a) Explain the following observations; (10 marks)

(i) The molecular weight of alkanes increase down the homologous series.

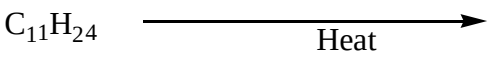
(ii) Alcohols of lower molecular weight are soluble in water.

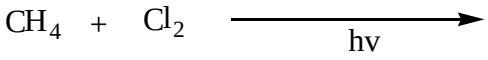
(iii) Alkenes decolorize bromine water.

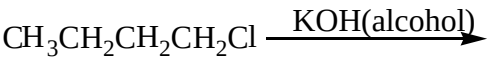
(iv) Boiling point of branched alkylhalides are generally lower compared to the corresponding straight-chain derivatives.

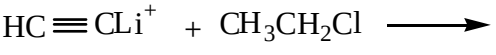
(v) Organic Chemistry is all around us.

(b) Give the products of the following reactions; (4 marks)

(i) 

(ii) 

(iii) 

(iv) 

(c) Arrange the following compounds in order of increasing acidity: (2 mark)

Ethane, Ethanol, ethanoic acid

(d) Give reasons for the answer in (b) above. (4 marks)

QUESTION 4

(a) (i) Draw any **FOUR** structural isomers of the compound with the molecular formula C_4H_9Br. (4 marks)

(ii) Give the IUPAC names of the isomers in (a) (i) above. (4 marks)

(b) Complete the following reactions giving all the necessary reaction conditions; (10 marks)

i) $CH_3\text{-}CH_3 + I_2 \longrightarrow$

ii) $CH_2{=}CH\text{-}CH_2CH_3 + HCN \longrightarrow$

iii) $CH_3\text{-}CH_2{=}CHCl\text{-}CH_2CH_3 + NaOH \longrightarrow$

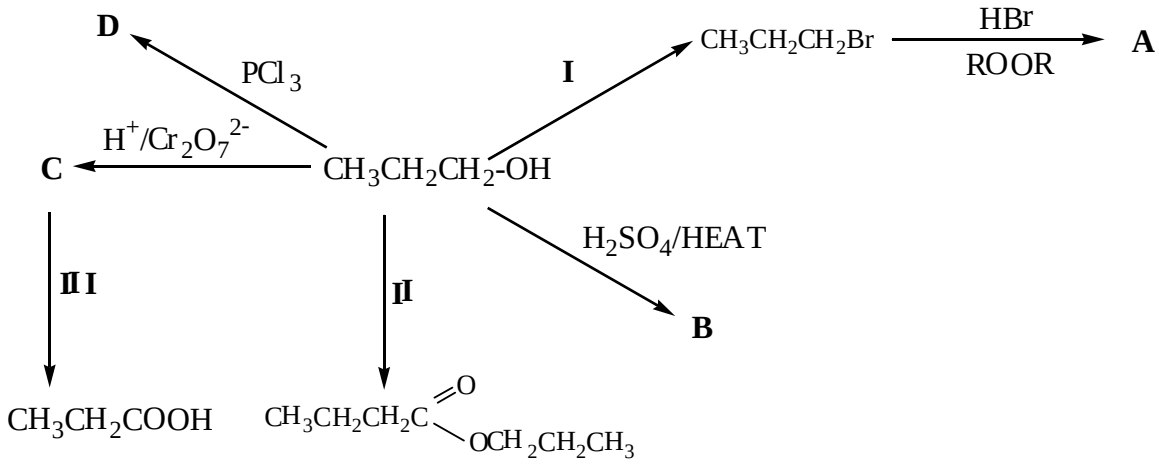
iv) $H{-}{\equiv}{-}H + 2H_2 \longrightarrow$

v) $CH_3\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}OH + CH_3\text{-}CH_2\text{-}COOH \longrightarrow$

(c) Distinguish TWO chemical tests that can be used to distinguish between propanal and propanone. (2 marks)

QUESTION 5

(a) The following is an illustration of some of the major reactions of propanol;



(i) Give the structures of the compounds A, B, C and D. (4 marks)

(ii) Give the reagents and the conditions for the reaction I, II, III. (6 marks)

(iii) Give the structures of the non-cyclic compounds which are isomeric with butanone. (2 marks)

(iv) Give two uses of compound C. (2 marks)

(b) The reactivity of halogenation of alkanes follows the order below;

$F_2 > Cl_2 > Br_2 > I_2 > As_2$

Explain. (4 marks)

(c) Alkenes are more reactive that alkanes. Why? (2 marks)

E

E N D

D

GOOD LUCK!!!!!!!!!!!!!!!!!!!!!!