COURSE CODE: SCH 3121/3122

COURSE TITLE: BASIC ORGANIC CHEMISTRY

EXAM VENUE: **STREAM: (BSC.)**

DATE: **EXAM SESSION:**
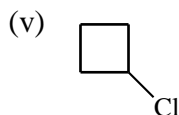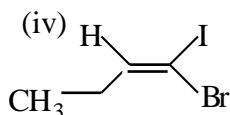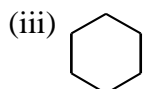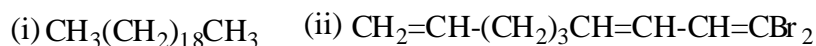
TIME: 2:00 HRS

Instructions:

1. **Answer question 1 (Compulsory) in Section A and ANY other 2 questions in Section B.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A: ANSWER ALL QUESTIONS (30 MARKS)

QUESTION ONE
(a) Briefly discuss the significance of studying Organic Chemistry.   (5 marks)
(b) State any **five** IUPAC rules of Nomenclature.   (5 marks)
(c) Give the IUPAC names of the following compounds;   (10 marks)

(i) $CH_3(CH_2)_{18}CH_3$ (ii) $CH_2=CH-(CH_2)_3CH=CH-CH=CBr_2$

(iii)   (iv) H I (v)

                        CH_3 Br

                                                      Cl

(d) Draw the structures of the following compounds;   (10 marks)
      (i)   Cyclodecene
      (ii)   Prop-2-enol
      (iii)   3,4-dibromo-3,4-dichlorohept-1-yne
      (iv)   Nonane
      (v)   2-bromo-2-chlorobutane

SECTION B (40 MARKS):
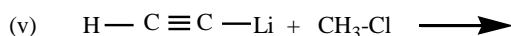ANSWER **ANY TWO** QUESTIONS FROM THIS SECTION-EACH QUESTION CARRIES **20 MARKS**

QUESTION TWO
(a) State and explain **THREE** properties of carbon atom that makes it unique.   (6 marks)
(b) Give any **FOUR** features of a homologous series.   (4 marks)
(c) Explain the following observations;   (10 marks)
     (i) Boiling points of alkanes increase with increase in carbon number.
     (ii) Branched alkylhalides have lower boiling points compared to the corresponding straight-line derivatives.
     (iii) Lower alcohols are miscible with water
     (iv) C-H-C bond angle is 109.5° in alkanes
     (v) C-H bond lengths in alkanes are equal.

QUESTION THREE

(a) Complete the following reactions;   (15 marks)
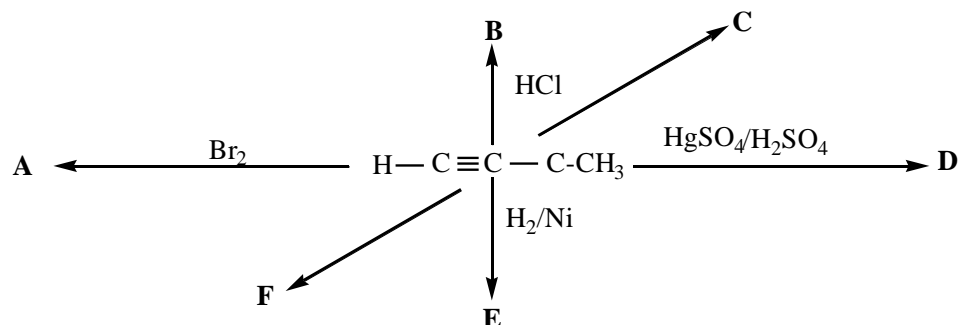
(i) $CH_3\text{-}C=CH_2$ + H_2O $\xrightarrow[25^oC]{H+}$

        |
        CH_3

(ii) CH_3CH_2 CH_3
        \   /
           $C=C$ $\xrightarrow{\begin{array}{c}1.\,O_3\\ 2.\,Zn/H_2O\end{array}}$
       /   \
    CH_3CH_2 H

(iii) $C_{11}H_{24}$ $\xrightarrow{HEAT}$

(iv) CH_3CH_3 + Cl_2 $\xrightarrow{UV}$

(v) $H-C\equiv C-Li$ + $CH_3\text{-}Cl$ $\longrightarrow$
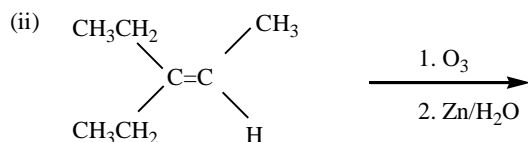
(b) Discuss the structure and bonding in methane   (5 marks)

QUESTION FOUR

(a) Give products (**A-F**) to complete the following scheme: (10 marks)

$A \xleftarrow{Br_2} H-C\equiv C-C\text{-}CH_3 \xrightarrow{HgSO_4/H_2SO_4} D$

with **B** (HCl up), **C** (up-right), **E** (H_2/Ni down), **F** (down-left)

(b) Give any **FOUR** uses of alkanes   (4 marks)
(c) Using an example, discuss the Markovnikov's rule   (6 marks)

QUESTION FIVE

(a) Organic Chemistry is the most important branch of Chemistry, Discuss.   (5 marks)
(b) Illustrate the three main steps involved in the photochlorination of methane   (5 marks)

(c) Define the following terms;   (10 marks)
       (i)   Catenation
       (ii)   Homologous series
       (iii)   Functional group
       (iv)   Cracking
       (v)   Hybridisation

*E**********N**********D*