JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL & PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE(ANIMAL SCIENCE)

1ST YEAR 1st SEMESTER 2015/2016 ACADEMIC YEAR

REGULAR

COURSE CODE: SCH 3112

COURSE TITLE: ORGANIC CHEMISTRY

EXAM VENUE: LAB 4 **STREAM: BED Sc.**

DATE: 25/04/16 **EXAM SESSION: 11.30 – 1.30 PM**

TIME: 2HOURS

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

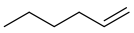
QUESTION ONE (30 MARKS)

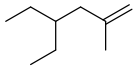
a. Name two factors and explain how they affect the melting points of alkanes. (4 marks)

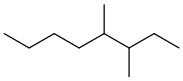
b. Define the term functional group and draw four examples of functional groups (4 marks)

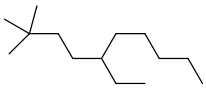
c. Using methane as an example explain why carbon is usually tetravalent in its compounds (4 marks)

d. Give the IUPAC names of the following (4 marks)

i. 

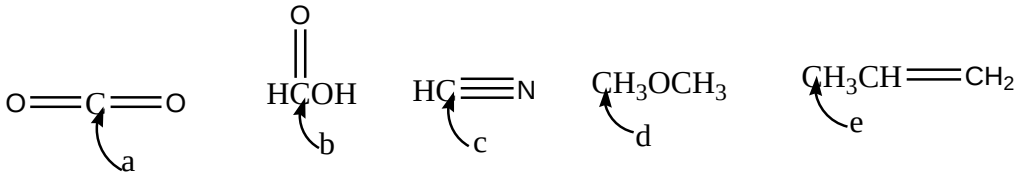
ii. 

iii. 

iv. 

e. What does saturation and unsaturation mean with reference to organic compounds (2 marks)

. For each of the following compounds, state the hybridization at each of the carbon atoms indicated a- e. (5 marks)



f. Draw the kekule and shorthand/line structures of the following molecules (3 marks)

1. 2-methylpropane
2. 2,4-dimethylheptane
3. 3,4-dimethyloctane

g. Name and give an example for two methods of preparation of alkenes (4 marks)

SECTION B

QUESTION 2 (20 MARKS)

a. When are the prefixes *iso*- and *neo*- used in the nomenclature of alkanes (2 marks)
b. Give the three major classes of carbohydrates (3 marks)
c. Define the two broad classes into which organic compounds are subdivided (6 marks)
d. State and give an example for two methods of preparation of alkanes (4 marks)
e. State three physical properties of alkynes (3 marks)
f. Provide and give two examples of essential amino acids (2 marks)

QUESTION 3 (20 MARKS)

a. How can a proteins be defined structurally and functionally (3 marks)
b. In terms of functional groups differentiate between alcohols and carboxylic acids (2 marks)

c. With an example for each explain how hydrogenation and hydration of alkenes occurs . (4 marks)

d. Briefly explain what is meant by the following terms (3 mark)]

i.Covalent bond ii.isomers iii. Hydrohalogenation

e. Illustrate the three major implications of hybridization in carbon compounds. (6 marks)
f. Explain the Zaitsev's rule (2 marks)

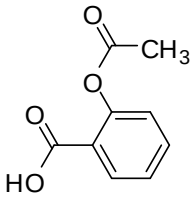
QUESTION 4 (20 MARKS)

a. What are the main functions of starch, glycogen and cellulose in living organisms (3 marks)

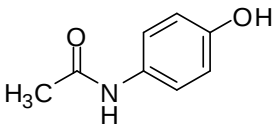
b. What are the five major functions that living organism must do for existence (5 marks)

c. Define the term hybridization and illustrate the general steps involved in sp^3 hybridization process (6 marks)

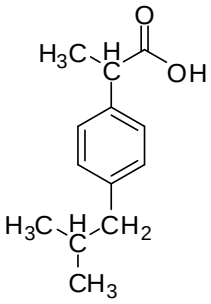
d. Compounds A, B and C are active ingredients in over-the-counter drugs used as analgesics (to relieve pain without decreasing sensibility or consciousness), antipyretics (to reduce the body temperature when it is elevated), and/or anti-inflammatory agents (to counteract swelling or inflammation of the joints, skin, and eyes). Name ***two*** functional groups in each molecule (6 marks)



A



B



C

QUESTION 5 (20 MARKS)

a. Define the term metabolism and name three macromolecules that control activities in living organisms (4 marks)

b. Draw the chemical structure of the following: (4 marks)
   i. 1-Ethyl-3-methylcyclohexane
   ii. 4-chloro-2-ethyl-1-methylcyclohexane

c. Other than carbon, hydrogen, oxygen and nitrogen; name six other elements which can also be found in organic compounds. (3 marks)

d. Describe the Markovnikov's rule (3 marks)

g. Differentiate between between fats and oils in terms of their presence and use (6 marks)