JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (BIOLOGICAL SCIENCE)

1ST YEAR 2ND SEMESTER 2016/17

MAIN REGULAR

COURSE CODE: SCH 3121

COURSE TITLE: ORGANIC CHEMISTRY

EXAM VENUE: **STREAM: (BED SCI)**

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**

INSTRUCTIONS: Answer Question 1 and any other TWO questions

QUESTION ONE (Compulsory) (30 marks)

1.(a) Draw the structure of the following compounds:

(i) 3-hydroxycyclopentanone.

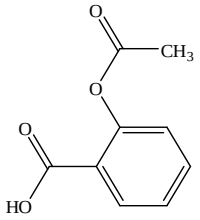
(ii) 2-methylbutanoic acid

(iii) 2-fluorohexanal

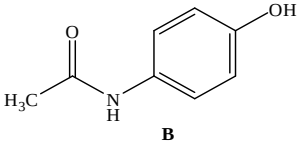
(iv) 1, 3, 5-triethylbenzene

(v) 3-methylcyclopentyne [10 marks]

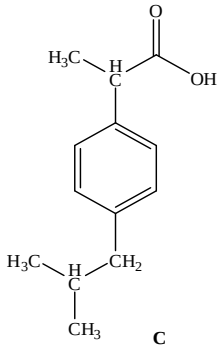
(b) Compounds A, B and C are active ingredients in over-the-counter drugs used as analgesics (to relieve pain without decreasing sensibility or consciousness), antipyretics (to reduce the body temperature when it is elevated), and/or anti-inflammatory agents (to counteract swelling or inflammation of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



A

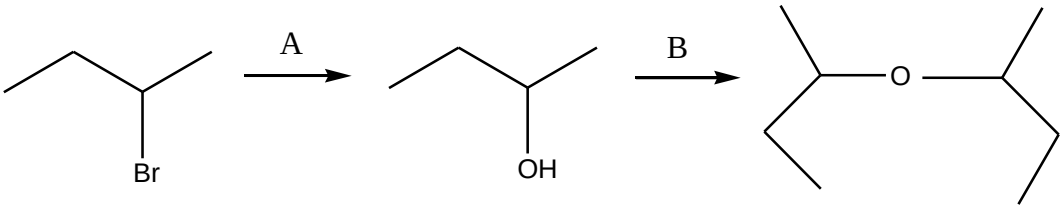


B



C

(c) Give the missing reagents A and B, for the following reaction to take place:



[4 marks]

(d) Define and give an example of;

(i) Structural isomers [3 marks]

(ii) Geometrical isomers [3 marks]

(e) Differentiate an amine from an amide using their general formula. [4 marks]

QUESTION TWO (20 marks)

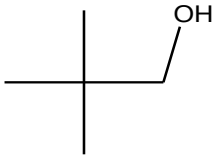
2. (a) (i) Given CH_3CH_2CHO as an aldehyde, differentiate between a Tollens test and Fehlings test. [6 marks]

(ii) Explain briefly why alcohols are highly miscible in water [2 marks]

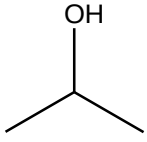
(iv) Using a 3 carbon chain differentiate between an aldehyde and a ketone. Provide names for each structure. [4 marks]

(b) Predict the product formed when the following compounds are oxidized:

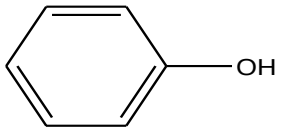
(i)



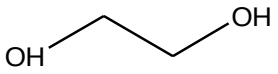
(ii)



(iii)



(iv)



[4 marks]

(c) State four physical properties of alkanes [4 marks]

QUESTION THREE (20 marks)

3. (a) Give a brief description of what Organic Chemistry is and give 2 examples of organic compounds in real life [4 marks]

(b) Define and give the two broad classes into which organic compounds are subdivided. [4 marks]

(c) State and give an example for any two reactions of alkenes [6 marks]

(d) Name any 4 ways of preparation of alkanes. [4 marks]

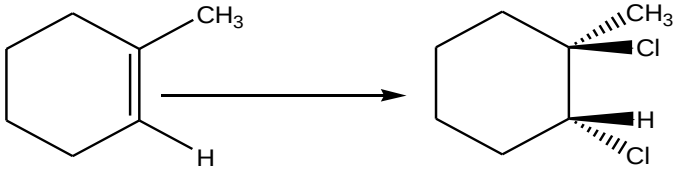
(e) Differentiate between a saturated and unsaturated hydrocarbons. [2 marks]

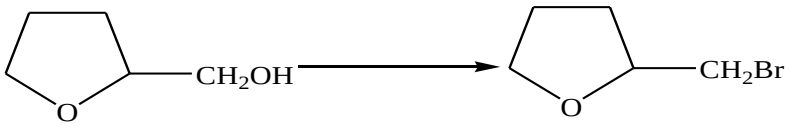
QUESTION FOUR (20 marks)

4. (a) Differentiate between a covalent bond and a carbocation [2 marks]

(b) Give reagents that are necessary to perform the following transformations. [4 marks]

i.



ii. 

(c) State the Markovnikovs rule [2 marks]

(d) Give any FOUR uses of alcohols. [4 marks]

(e) The following name is incorrect. Draw the molecule and give its correct name.
1-methyl-2-cyclopentene [4 marks]

(f) Propose any structure for simple molecules that contain the following groups;
(i) An amide
(ii) Ether
(iii) Alkyl halide
(iv) An amine [4 marks]