



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

UNIVERSITY SUPPLEMENTARY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF**

**BACHELOR OF SCIENCE (CHEMISTRY) & BACHELOR OF
EDUCATION SCIENCE**

COURSE CODE: SCH 131

COURSE TITLE: ORGANIC II CHEMISTRY

DATE: 4TH AUGUST, 2022

TIME: 8 AM -10AM

INSTRUCTIONS TO CANDIDATES

Total Marks: 70

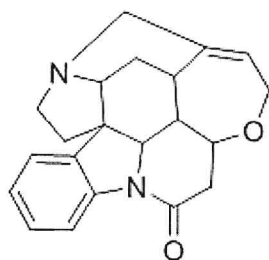
Answer all the Questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

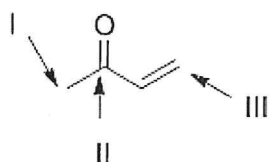
Q1. A-i). Identify any two functional groups that are present in strychnine. [2marks]



Strychnine

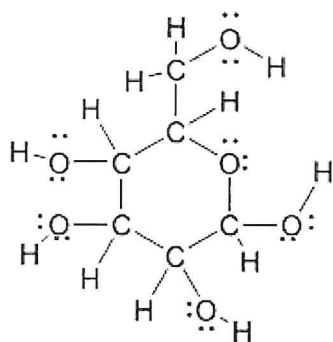
A-ii) Write the electronic configurations using the s, p, d and f sub shell format of the elements; N, Mg and Ar [3marks]

B). Indicate the hybridization as well the bond angles for the atoms labelled I – III in the following organic compound. [6 Marks]



Q2. Answer the following

I. Redraw the following structure of glucose as a skeletal structure. [3 Marks]



Glucose

II. Draw a Lewis structure for each of the following compounds. Show your steps.

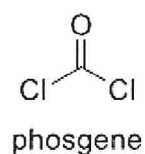
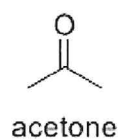
a) C_2H_6

b) CH_5N

[4 Marks]

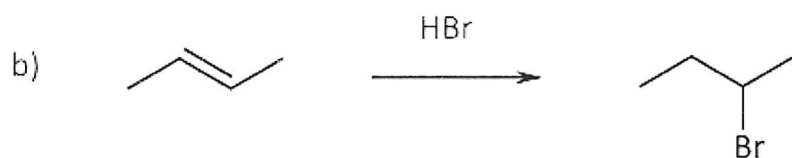
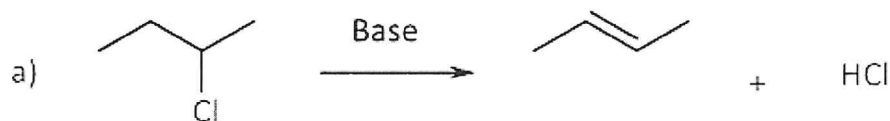
Q3. Answer the following

Which compound has the larger dipole moment, acetone or phosgene? Explain. [2 Marks]

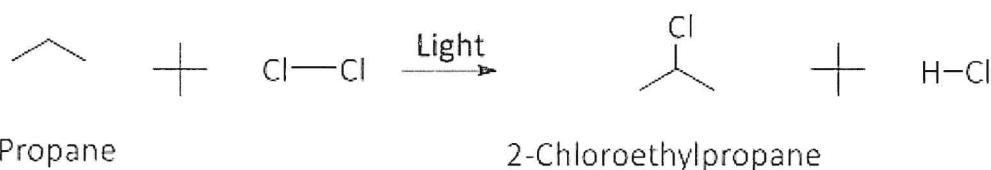


Q4 Answer the following

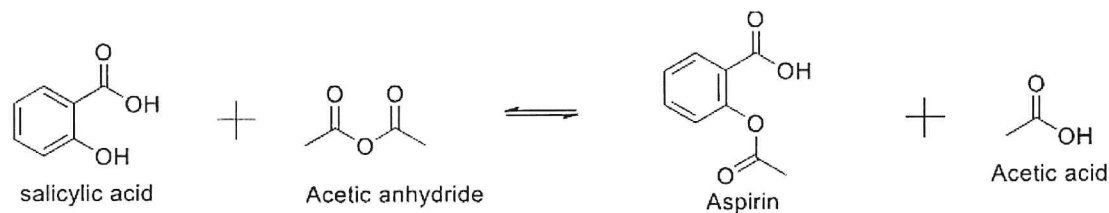
I. Classify the following reactions as addition, elimination, substitution or rearrangement. [2 Marks]



II. Write equations and mechanism for the initiation, propagation and termination reactions leading to the formation of 1-chloroethylcyclopropane from propane and chlorine. [5Marks]



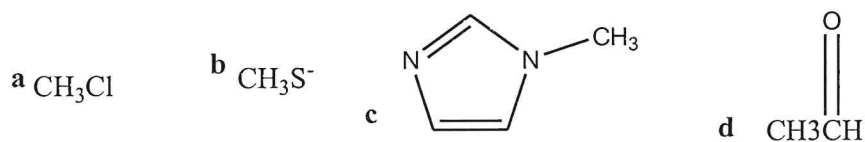
iii. In SCH 102 practical's you prepared the pain reliever aspirin by reacting salicylic acid with acetic anhydride as shown in the reaction scheme below. Identify the nucleophile and electrophile. Provide mechanism for reaction using electron-pushing arrows to indicate the flow of electrons in each step of the synthesis. [6Marks]



5. Define the following terms [5 marks]

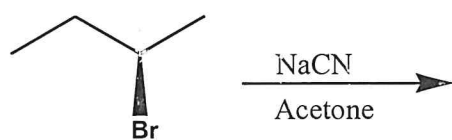
- i) Electrophiles
- ii) Nucleophiles
- iii) Polar reactions
- iv) Homolytic reaction
- v) π bonds

6. Which of the following species are likely to be nucleophiles and which electrophiles? Which might be both? [6 marks]

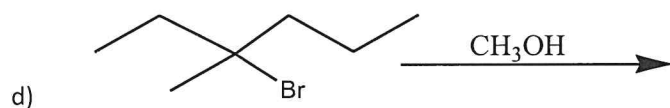


7. Differentiate between the following reaction mechanisms. [2marks]

- a) $\text{E}1$ and $\text{E}2$
- b) Draw all possible **Newman** conformations of 2-bromo butane [4marks]
- c) Show the mechanism and **$\text{S}N2$** products formed with the following. [4marks]



d. Using **$\text{S}N1$** and **$\text{E}1$** mechanism predict all the major and minor products formed with the molecule below. [10mks]



8. I. Give the Newman's projection conformation necessary for E2 mechanisms of halo alkane. [2marks]

II. What is a **gauche** interaction? 2mks

III. Define zaitsev's rule. 2mks