

BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
INDUSTRIAL CHEMISTRY PROGRAMME

2022/2023 B.SC DEGREE SECOND SEMESTER EXAMINATION

Course Code: CHM 224

Courses Title: ORGANIC CHEMISTRY I

Date: 17/06/2023

Time Allowed: 3 hours

INSTRUCTIONS: Answer 4 QUESTIONS in all, at least ONE from each section.

SECTION A

QUESTION ONE

- a. Using benzene and any other reagent of choice, answer questions i-v. For each reaction clearly state the reagents used.
- i. Draw a chart to illustrate at least 5 reactions that aromatic compounds undergo (10 Marks)
 - ii. Clearly state the reagent/catalyst used. (5 Marks)
 - iii. Classify the reactions into substitution, addition or eliminations reactions (5 Marks)
 - iv. Name each of the products (5 Marks)

QUESTION TWO

- a. Explain what you understand by the following terms (12 Marks)
- i. proteins ii. Carbohydrates iii. peptides iv. monosaccharide v. amino acids vi. polypeptides
- b. Draw a representative structure for iv and v (4 Marks)
- c. Differentiate between aldose and ketose (4 Marks)
- d. What are the major differences between lactose, fructose and maltose. (3 Marks)
- e. Fill in the spaces provided in the statement below. (2 Marks)
- _____ breaks down carbohydrate in living animals and converts it to glucose during digestion via a process called _____.

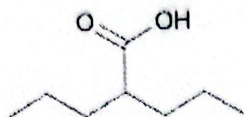
SECTION B

QUESTION THREE

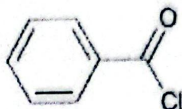
- a. Give different equations for the preparation of hexanedioic acid from cyclohexane and benzene, showing all the reagents. 8 Marks

- b. Provide the IUPAC names for the following compounds: 10 Marks.

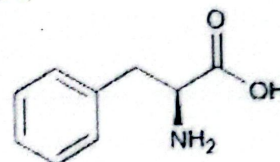
i.



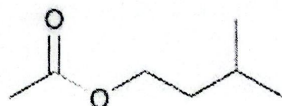
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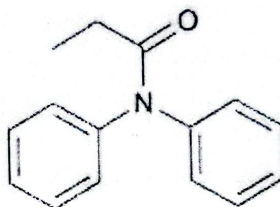
iii.



iv.



v.

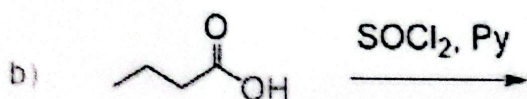
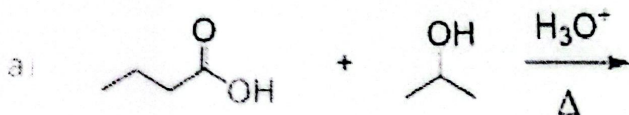


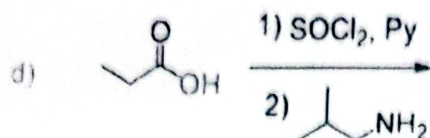
- c. Mention five derivatives of carboxylic acids and indicate the general formula for each one. 7 Marks

QUESTION FOUR

- a. Explain the following properties of carboxylic acids: 9 Marks
- Boiling points
 - Melting points
 - Solubilities

- b. Predict the **major product** for each nucleophilic acyl substitution reaction below: 6 Marks

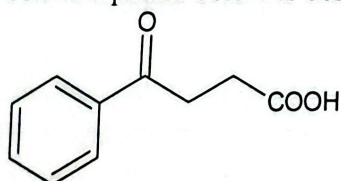




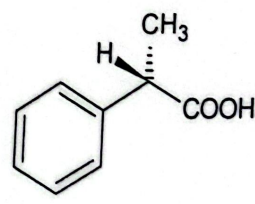
- c. Give the structures of the following carboxylic acids and derivatives: 10 Marks
- Cyclohexyl methanoate
 - 3-chlorobutanoyl chloride
 - 4-hydroxypentanoic acid lactone
 - N,N-dimethylcyclopropane carboxamide
 - 4-amino-2-methylpentanoic acid lactam

QUESTION FIVE

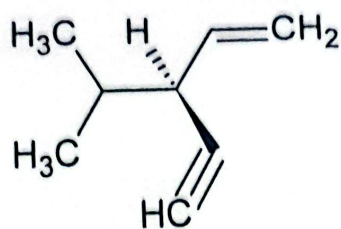
- Briefly explain the term 'Organic named reaction'. 2 Marks
- Give two examples of organic named reactions. 6 Marks
- Explain the mechanism of the reaction below: 8 Marks
- What are alicyclic compounds? 2 Marks
- Give two named examples of alicyclic compounds. 4 Marks
- The compound below is best named as _____. 3 Marks



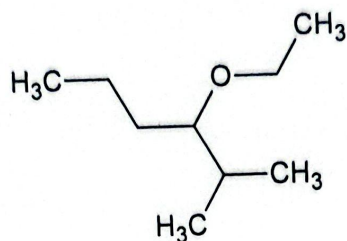
QUESTION SIX

- Define the following terms: 6 Marks
 - Enantiomer
 - Diastereomers
 - Optical activity
- Give the IUPAC names of the following compound indicating their correct configurations: 12 Marks
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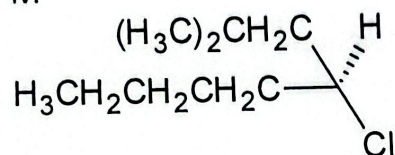
ii.



iii.

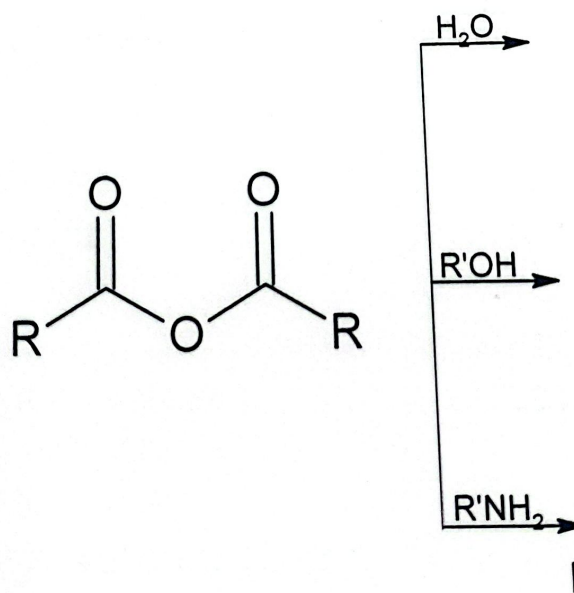


iv.



c. Give the products of the reactions given below:

6 marks



d. Name the functional group reacting in 'c' above.

1 Mark.