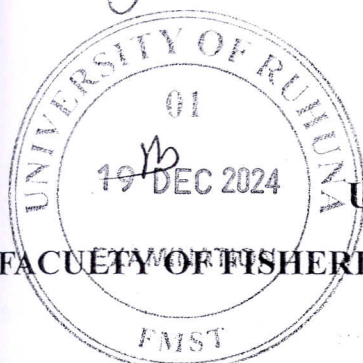


Part II only



Index Number:

UNIVERSITY OF RUHUNA
FACULTY OF FISHERIES AND MARINE SCIENCES & TECHNOLOGY

Academic Year 2023/2024

Bachelor of Science Honours in Fisheries and Marine Sciences Degree/

Bachelor of Science Honours in Marine and Freshwater Sciences Degree

Level II Semester I Examination – Oct / Nov 2024

CHM 2122: Organic Chemistry

Time: 1 hour and 30 minutes

Instructions:

- **Answer all questions in part I** in the paper itself . In each of the questions 1-15 in part I, pick one of the alternatives from (A), (B), (C),(D) and (E) which is correct or most appropriate and underline your selection.
- **Answer any two (02) questions from part II.** Use the answer writing book to answer the questions in part II.

Part I – (30Marks)

Answer **all** questions.

Part II – Essay (70 Marks)

Answer only 02 questions.

01. Answer all parts.

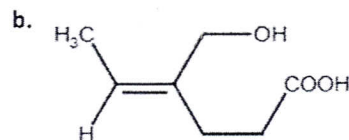
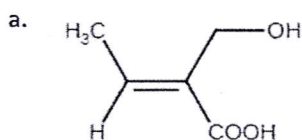
A. Conformations are any three-dimensional arrangements of atoms in a molecule that result from rotation about a single bond.

- I. Draw Newman Projection of the anti-staggered, eclipse, and gauche conformations of n-butane and name them accordingly.
- II. With indicating all possible conformers obtained from the rotation of the **C2-C3** bond, draw a suitable curve of potential energy vs dihedral angle for n-butane.
- III. Explain why the chair conformation of cyclohexane is more stable than cyclobutene.

(50 marks)

B. Give answers to the following questions about isomers.

- I. With giving proper reasons classify these compounds with their E or Z designations.



- II. Draw the structures of cis-1,4-dimethylcyclohexane and trans-1,4-dimethylcyclohexane.

(20 marks)

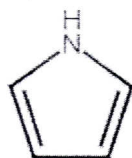
C. Compounds "X" and "Y" both have the molecular formula C_7H_{14} . Compounds "X" and "Y" rotate the plane of the plane-polarized light and are diastereomers on each other. The catalytic hydrogenation of these compounds yields the same compound "K" (C_7H_{16}). Compound K is found to be optically active. Propose possible structures for "X", "Y" and "K".

(30 marks)

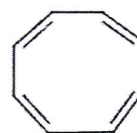
2. Answer all parts.

A. Apply the Hukel rule and identify whether the following compounds are aromatic or not.

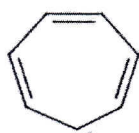
I.



III.



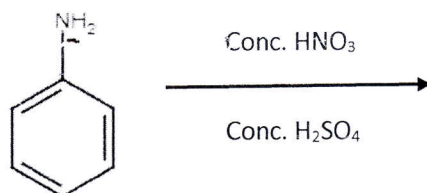
II.



(30 marks)

B.

- I. What is the characteristic reaction type that can be observed in benzene?
- II. Explain the reason for the characteristic reaction type of benzene.
- III. With indicating product write a suitable mechanism for following the reaction. explain why meta substituted product is not likely to form in this reaction.



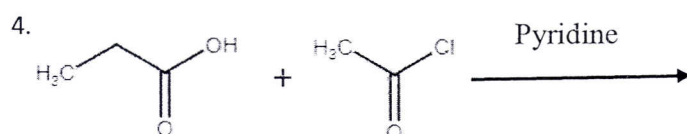
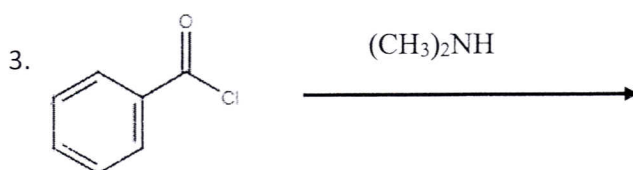
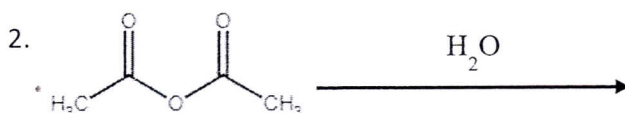
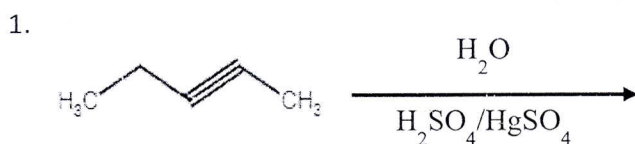
(50 marks)

- C. Esterification of a carboxylic acid occurs in the presence of an acid catalyst but not in the presence of base catalyst. Explain this comment by using the proper mechanism.

(20 marks)

3. Answer all parts.

A. Draw the product/s of the reactions below.



(20 marks)

benzene?
ene.
Following the reaction
this reaction.

(50 marks)

catalyst but not
proper

(20 marks)

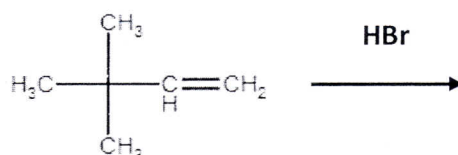
(20 marks)

B.

- I. What is the characteristic type of reaction observed in aldehydes?
- II. Treatment of an aldehyde with primary amine shows a reaction to afford an imine. Explain this observation by using a suitable mechanism.
- III. What is the expected result when an aldehyde reacts with secondary amine?
(45 marks)

C.

- I. With mentioning the type of reaction, draw a suitable mechanism to predict the product of the following reaction.



- II. State the reason for the production of the above product.

(35 marks)

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