

**University of Ruhuna - Faculty of Technology****Bachelor of Biosystems Technology Honours Degree****Level 1 (Semester II) Examination, November/December 2023****Academic year 2021/2022****Course Unit: BST 1232 Organic Chemistry (Theory)      Duration: 1 & 1/2 hours**  
.....**Index Number: .....****Instructions to candidates:**

Please read and follow the instructions carefully before answering the questions.

- Answer **only Four (4)** questions.
- Answers should be given in the spaces allocated in the question paper.

Total number of questions

05

Total number of pages

11

Question Number	Marks out of 25
01	
02	
03	
04	
05	
Total out of 100	

1. Answer all parts.

i. What is the characteristic reaction type of Alkane.

.....

(2 marks)

ii. Briefly explain your answer in part A (i).

.....

.....

.....

.....

(3 marks)

iii. Write down a plausible mechanism for the chlorination of methane to obtain  $\text{CH}_3\text{Cl}$ .

(8 marks)

iv. State whether the following statement is **TRUE** or **FALSE**. Explain your answer.

“Ethane ( $\text{CH}_3\text{CH}_3$ ) can be produced during the chlorination reaction of methane”

TRUE or FALSE: .....

(2 marks)

Explanation:

.....  
.....  
.....  
.....  
.....

(5 marks)

v. What do the numbers 92 and 95 on gasoline means?

.....  
.....  
.....  
.....

(5 marks)

2. Answer all parts.

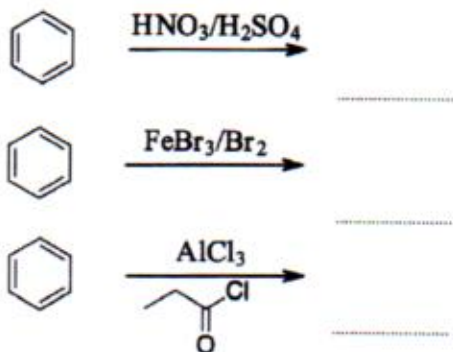
a. Benzene is the simplest molecule among aromatic compounds.

i. Benzene is more favorable for electrophilic substitution reactions. Explain the statement.

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(4 marks)

ii. Draw the structure of the product for each reaction given below.

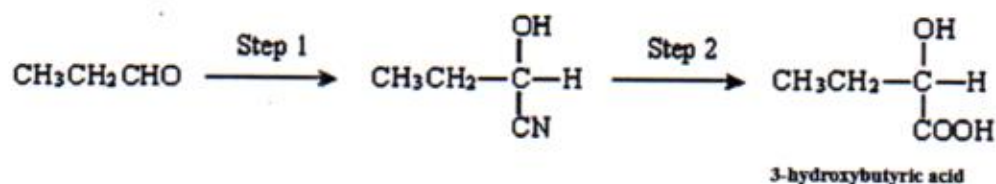


(6 marks)

iii. Propose a reaction sequence for synthesizing benzene starting from nitrobenzene.

(9 marks)

b. Consider the following reaction series for synthesizing the monomer (3-hydroxybutyric acid) required for the production of the biodegradable polyhydroxybutyrate polymer (PHB).



(6 marks)

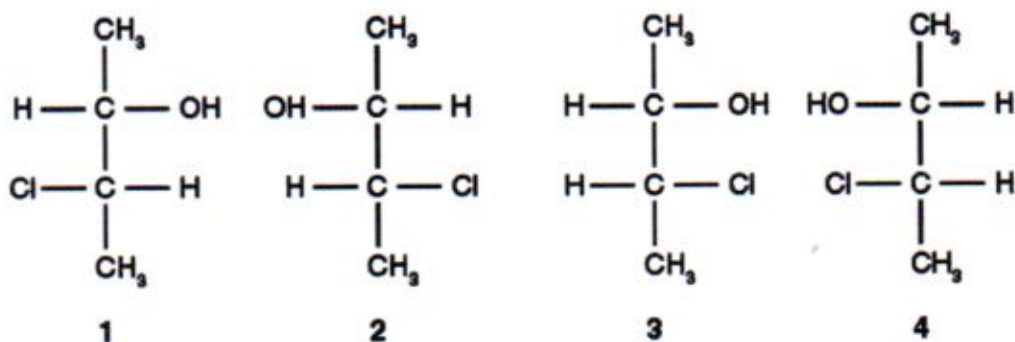
i. Give a suitable reagent to be used in the step 1.

.....





b. Consider the following structures (1 to 4) to answer the questions.



i. Which of above molecules are enantiomers of each other?

.....

(2 marks)

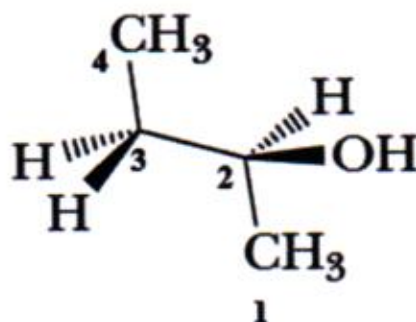
ii. Which of above molecules are diastereomers of each other?

.....

(2 marks)

4. Answer all parts.

a. Staggered conformation of one of the stereoisomers of 2-butanol is given below.



i. State whether above compound is R or S.

.....

(3 marks)

ii. Draw a Newman projection for this staggered conformation, viewed along the bond between carbons 2 and 3.

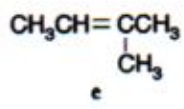
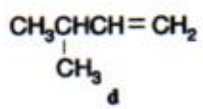
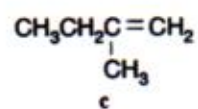
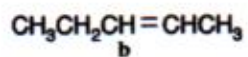
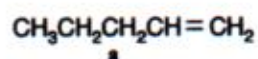
(5 marks)

b. Draw all the possible acyclic chain isomers corresponding to the molecular formula  $C_5H_{12}O$  containing alcohol functional group.

(8 marks)



c. The given structures represent potential isomers of pentene. Determine if any of these demonstrate geometric isomerism, and if so, illustrate those geometric isomers.

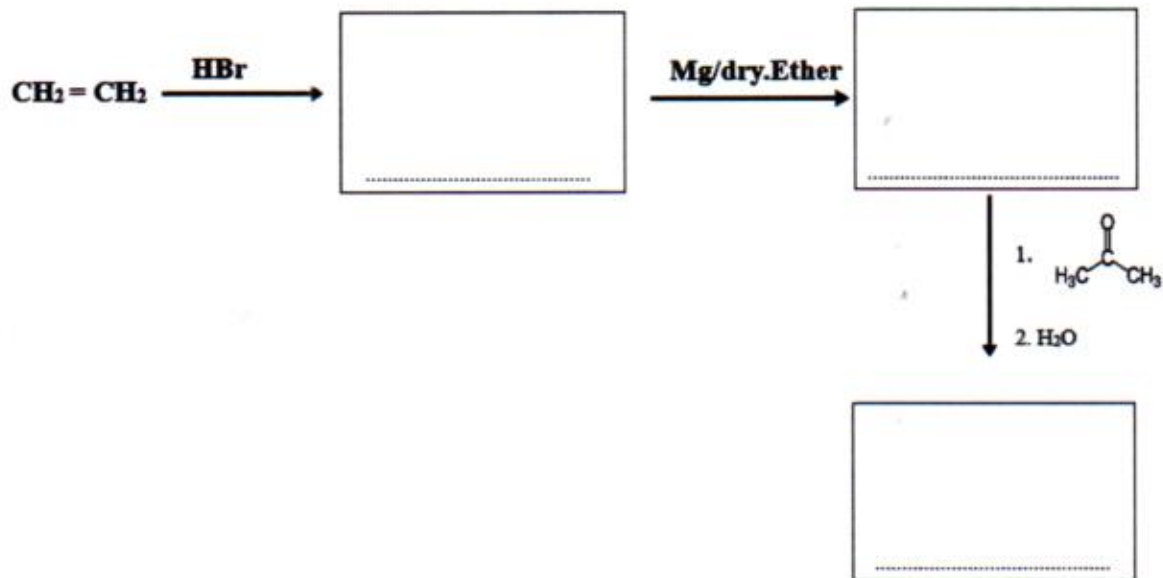


(9 marks)

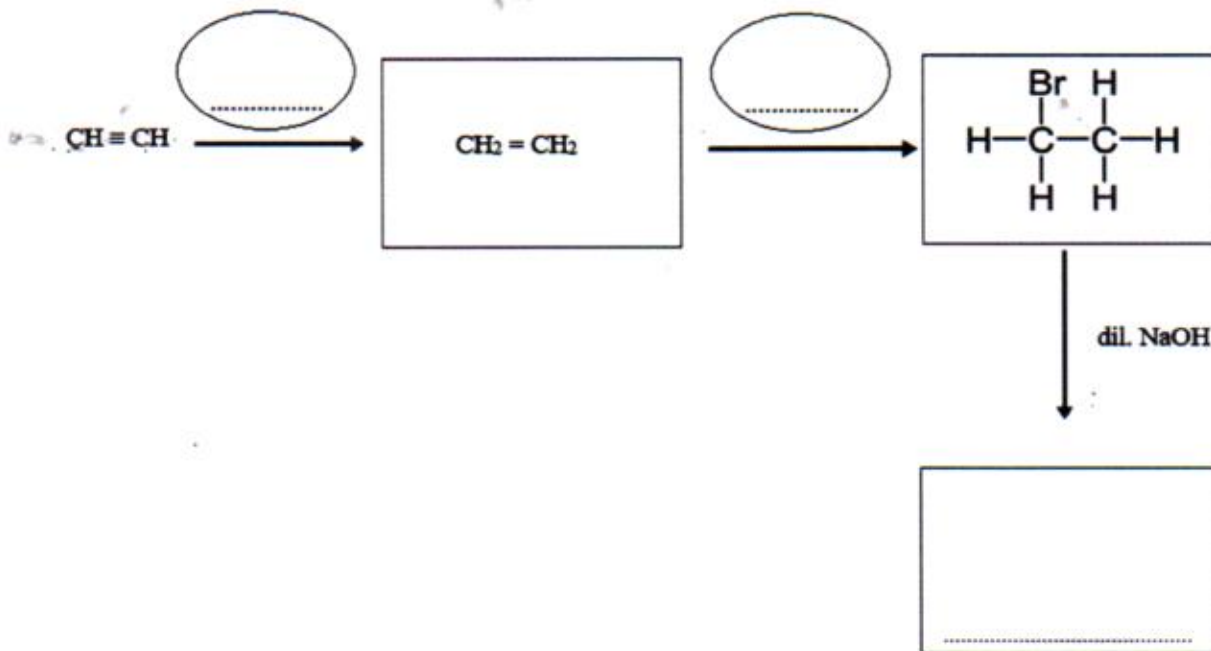
5. Complete the given conversions by providing the appropriate reagents/catalysts in the ellipses and the resulting compounds in the rectangles.

(5 marks x 5= 25 marks)

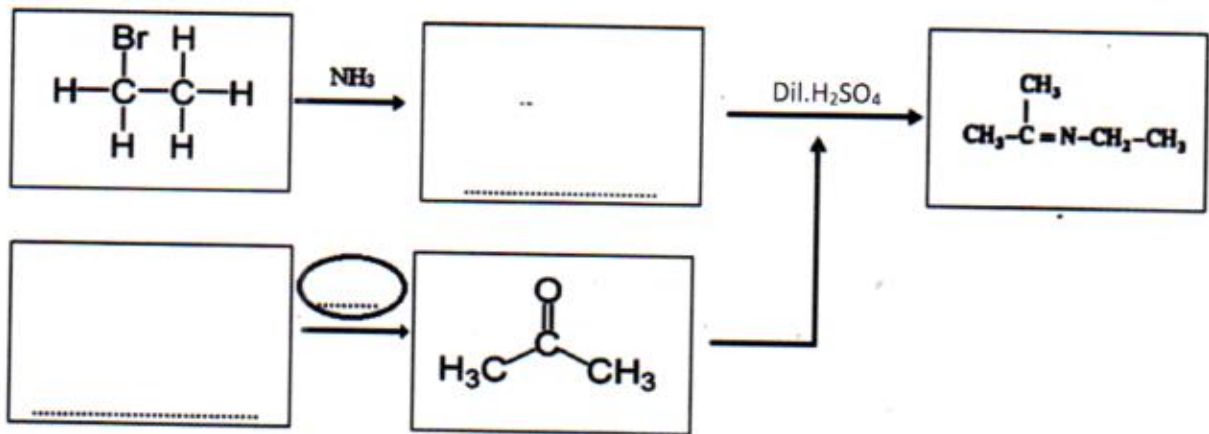
i.



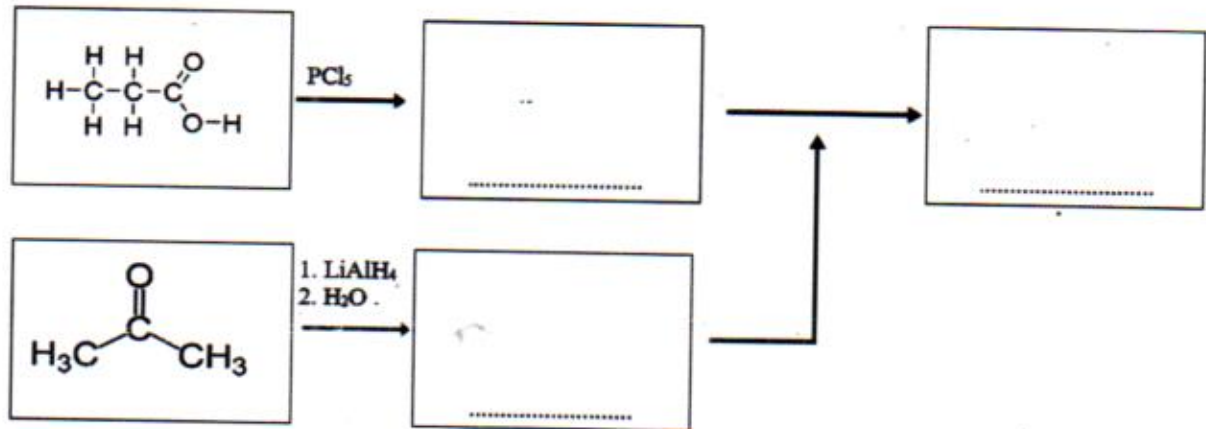
ii.



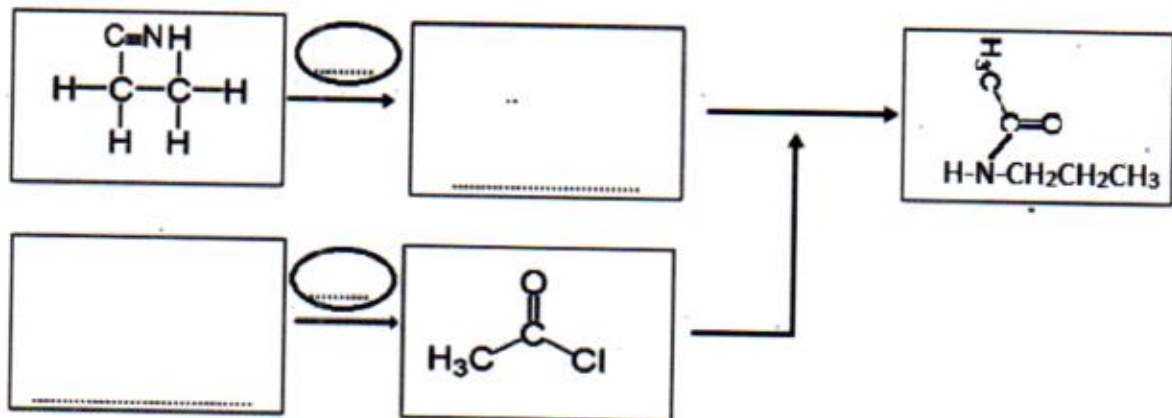
iii.



iv.



v.



.....End of the paper.....