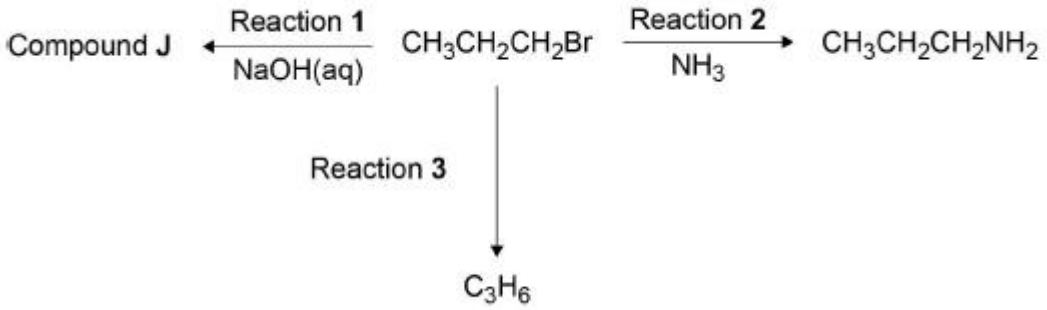
Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

The diagram shows some compounds made from a halogenoalkane.



(a) Draw the displayed formula of compound **J**.

(1)

(b) Name the mechanism for Reaction **2** and give an essential condition used to ensure that $CH_3CH_2CH_2NH_2$ is the major product.

Name of mechanism _____

Condition _____

(2)

(c) Calculate the mass, in grams, of $CH_3CH_2CH_2NH_2$ produced from 25.2 g of $CH_3CH_2CH_2Br$ in Reaction **2** assuming a 75.0% yield.

Give your answer to the appropriate number of significant figures.

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Mass _____ g

(3)

(d) When Reaction **2** is carried out under different conditions, a compound with molecular formula $C_9H_{21}N$ is produced.

Draw the skeletal formula of the compound.

Identify the functional group in the compound including its classification.

Skeletal formula

Functional group including classification _____

(2)

(e) Identify the reagent and conditions used in Reaction **3**.

_____

(1)

(f) Name and outline a mechanism for Reaction 3.

Name of mechanism _____

Mechanism

(4)

(Total 13 marks)

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Q2.

This question is about isomerism.

(a) How many isomers are represented by the formula C_5H_{12}?

Tick (✔) **one** box.

2 ☐ 3 ☐ 4 ☐ 5 ☐

(b) Name the type of structural isomerism shown by the isomers of C_5H_{12}

_____

(1)

(c) 2-Hydroxypropanenitrile displays optical isomerism.

Draw three-dimensional representations of the two enantiomers of 2-hydroxypropanenitrile, showing how the two structures are related to each other.

(2)

(d) Describe how separate samples of each of these enantiomers could be distinguished.

_____

_____

_____

_____

(2)

(e) Butan-2-ol reacts with concentrated sulfuric acid to produce three isomeric alkenes.

Name and outline a mechanism to show how any **one** of the alkenes is formed.

Explain how this reaction can lead to the formation of each of these **three** alkenes.

Name of mechanism _____

Mechanism

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Explanation _____

_____

_____

_____

_____

_____

_____

_____

_____

(8)

(Total 13 marks)

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