Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

This question is about 2-bromopropane.

(a) Define the term electronegativity.

Explain the polarity of the C–Br bond in 2-bromopropane.

Electronegativity _____

_____

_____

Explanation _____

_____

_____

(3)

(b) Outline the mechanism for the reaction of 2-bromopropane with an **excess of ammonia**.

(4)

(c) Draw the skeletal formula of the main organic species formed in the reaction between a **large excess of 2-bromopropane** and ammonia.

Give a use for the organic product.

Skeletal formula

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Use _____

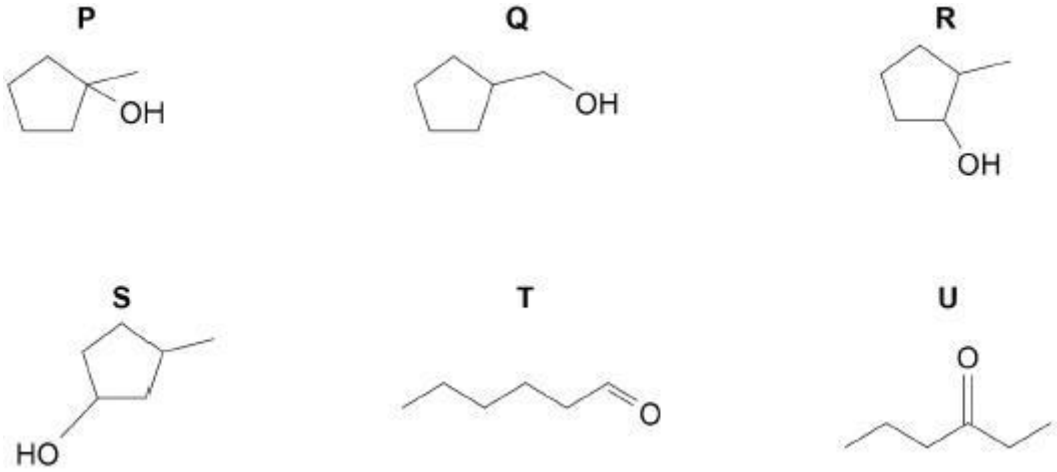
(2)

(Total 9 marks)

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Q2.

This question is about the structural isomers shown.



(a) Identify the isomer(s) that would react when warmed with acidified potassium dichromate(VI).

State the expected observation when acidified potassium dichromate(VI) reacts.

Isomer(s) _____

Expected observation _____

_____

(2)

(b) Identify the isomer(s) that would react with Tollens' reagent.

State the expected observation when Tollens' reagent reacts.

Isomer(s) _____

Expected observation _____

_____

(2)

(c) Separate samples of each isomer are warmed with ethanoic acid and a few drops of concentrated sulfuric acid. In each case the mixture is then poured into a solution of sodium hydrogencarbonate.

Identify the isomer(s) that would react with ethanoic acid.

Suggest a simple way to detect if the ethanoic acid reacts with each isomer.

Give a reason why the mixture is poured into sodium hydrogencarbonate solution.

Isomer(s) _____

Suggestion _____

_____

_____

Reason _____

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_____

(3)

(d) State the type of structural isomerism shown by isomers **P**, **Q**, **R** and **S**.

_____

(1)

(e) Describe fully how infrared spectra can be used to distinguish between isomers **R**, **S** and **T**. Use data from **Table A** in the Data Booklet in your answer.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(f) State why mass spectrometry using electrospray ionisation is **not** a suitable method to distinguish between the isomers.

_____

_____

(1)

(Total 13 marks)

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