

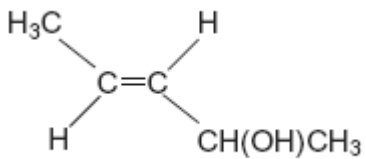
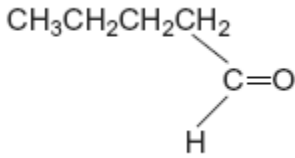
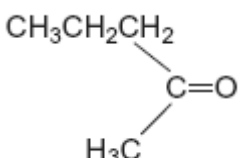
Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Q1.

The table below shows the structures of three isomers with the molecular formula $C_5H_{10}O$

Isomer 1 	(E)-pent-3-en-2-ol
Isomer 2 	pentanal
Isomer 3 	

(a) Complete the table by naming Isomer 3.

(1)

(b) State the type of structural isomerism shown by these three isomers.

(1)

(c) The compound (Z)-pent-3-en-2-ol is a stereoisomer of (E)-pent-3-en-2-ol.

(i) Draw the structure of (Z)-pent-3-en-2-ol.

(1)

- (ii) Identify the feature of the double bond in (*E*)-pent-3-en-2-ol and that in (*Z*)-pent-3-en-2-ol that causes these two compounds to be stereoisomers.

(1)

- (d) A chemical test can be used to distinguish between separate samples of Isomer **2** and Isomer **3**.

Identify a suitable reagent for the test.

State what you would observe with Isomer **2** and with Isomer **3**.

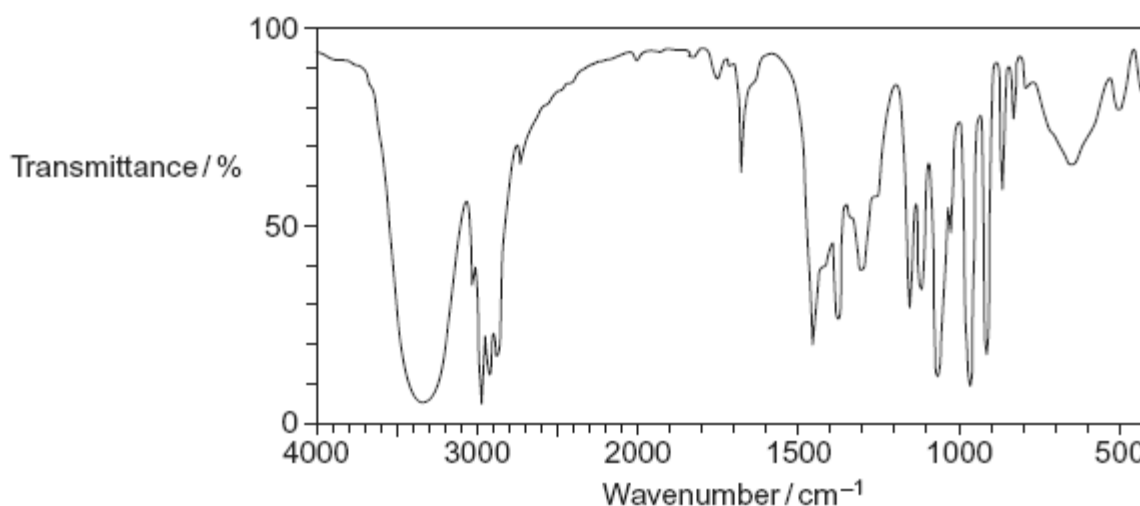
Test reagent _____

Observation with Isomer **2** _____

Observation with Isomer **3** _____

(3)

- (e) The following is the infrared spectrum of one of the isomers **1**, **2** or **3**.



- (i) Deduce which of the isomers (**1**, **2** or **3**) would give this infrared spectrum. You may find it helpful to refer to **Table 1** on the Data Sheet.

(1)

- (ii) Identify two features of the infrared spectrum that support your deduction. In each case, identify the functional group responsible.

Feature 1 and functional group _____

Feature 2 and functional group _____

(2)

(Total 10 marks)

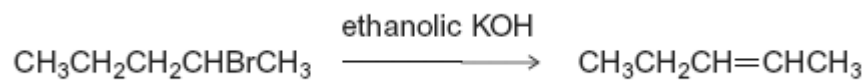
Q2.

Organic reaction mechanisms help chemists to understand how the reactions of organic compounds occur.

The following conversions illustrate a number of different types of reaction mechanism.

(a) When 2-bromopentane reacts with ethanolic KOH, two structurally isomeric alkenes are formed.

(i) Name and outline a mechanism for the conversion of 2-bromopentane into pent-2-ene as shown below.

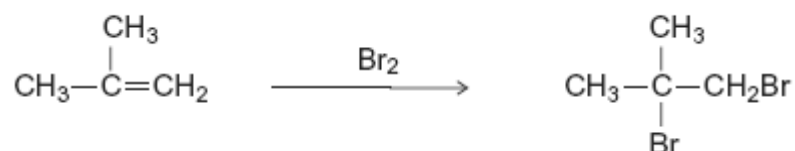


(4)

(ii) Draw the structure of the other structurally isomeric alkene produced when 2-bromopentane reacts with ethanolic KOH.

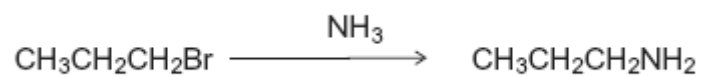
(1)

(b) Name and outline a mechanism for the following conversion.



(5)

(c) Name and outline a mechanism for the following conversion.



(Total 15 marks) (5)