

Name of the Student: _____

Max. Marks : 27 Marks

Time : 27 Minutes

Q1.

(a) Octane (C_8H_{18}) is an important compound in petrol.

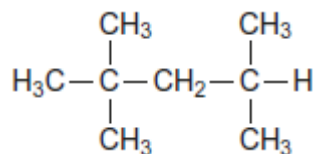
(i) Identify the homologous series to which octane belongs.

(1)

(ii) Write an equation to show the complete combustion of C_8H_{18}

(1)

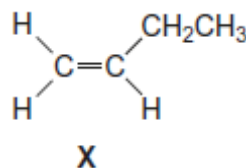
(iii) An isomer of octane used to improve the performance of car engines is shown.



Give the IUPAC name of this isomer.

(1)

(b) Compound X is produced when an alkane is cracked.



(i) Give the IUPAC name for compound X.

(1)

(ii) One molecule of an alkane is cracked to produce one molecule of compound X, one molecule of octane and one molecule of ethene.

Deduce the molecular formula of this alkane.

(1)

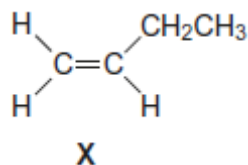
- (iii) Name the type of cracking that produces a high yield of compound **X**.
Give **two** conditions required for this process.

Type of cracking _____

Conditions _____

(2)

- (iv) Compound **X** has several isomers. The structure of **X** is repeated here.



Draw the displayed formula of a chain isomer, a position isomer and a functional group isomer of compound **X**.

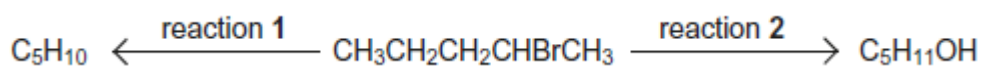
Type of isomer	Displayed formula of isomer of compound X
Chain	
Position	
Functional group	

(3)

(Total 10 marks)

Q2.

Two reactions of 2-bromopentane, ($\text{CH}_3\text{CH}_2\text{CH}_2\text{CHBrCH}_3$) are shown.



The C_5H_{10} formed in reaction **1** exists as a mixture of three isomers, one of which is pent-1-ene. Two of the isomers are a pair of stereoisomers. All three isomers decolourise bromine.

- (a) The same reagent is used in both reactions. The product is determined by the choice of conditions.

State the reagent and the conditions for each of reaction **1** and reaction **2**.

State the role of the reagent in each reaction.

Name and outline the mechanism of reaction **1** for the formation of pent-1-ene.

(8)

- (b) All three isomers of C_5H_{10} contain the same functional group.

Draw the displayed formula of pent-1-ene.

Draw the structures of the pair of stereoisomers and give their full IUPAC names.

Explain the origin of the stereoisomerism shown.

(5)

- (c) The rates of hydrolysis of two chloroalkanes can be investigated by adding aqueous silver nitrate to the chloroalkanes. During the hydrolysis reactions, chloride ions are liberated slowly. Precipitates of silver chloride are formed.

Outline a method to compare the rate of hydrolysis of 1-chlorobutane with that of 2-chlorobutane. State how the method would ensure a fair test.

(4)

(Total 17 marks)