Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: IntroductionTo Organic Chemistry

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Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

Central heating fuel, obtained by the fractional distillation of crude oil, contains saturated hydrocarbons with the molecular formula $C_{16}H_{34}$

(a) Give the meaning of the terms **saturated** and **hydrocarbon** as applied to saturated hydrocarbons.

Saturated _____

_____

Hydrocarbon _____

_____

(2)

(b) If the boiler for a central heating system is faulty, a poisonous gas may be produced during the combustion of $C_{16}H_{34}$

Write an equation for the reaction that forms this poisonous gas and one other product only.

_____

(1)

(c) Explain why the sulfur compounds found in crude oil should be removed from the fractions before they are used for central heating fuel.

_____

_____

_____

_____

_____

(2)

(d) A hydrocarbon $C_{16}H_{34}$ can be cracked to form C_8H_{18}, ethene and propene.

(i) Write an equation to show this cracking reaction.

_____

(1)

(ii) Suggest **one** important substance manufactured on a large scale from propene.

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(1)

(iii) Draw the **displayed formula** of the functional group isomer of propene.

(1)

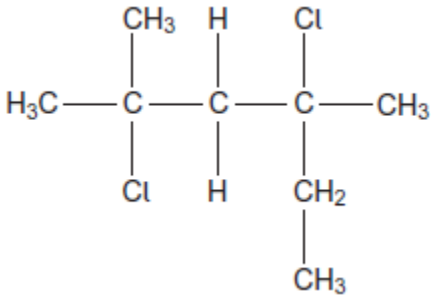
(e) There are many structural isomers with the molecular formula C_8H_{18}

Draw the structure of 2,3,3-trimethylpentane.

(1)

(f) A compound C_8H_{18} reacts with chlorine to give several haloalkanes.

Give the IUPAC name of the following haloalkane.



(1)

(Total 10 marks)

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Q2.

There are many uses of halogenated organic compounds despite environmental concerns.

(a) Bromotrifluoromethane is used in fire extinguishers in aircraft.
Bromotrifluoromethane is formed when trifluoromethane reacts with bromine.

$$CHF_3 + Br_2 \longrightarrow CBrF_3 + HBr$$

The reaction is a free-radical substitution reaction similar to the reaction of methane with chlorine.

(i) Write an equation for each of the following steps in the mechanism for the reaction of CHF_3 with Br_2

Initiation step

_____

First propagation step

_____

Second propagation step

_____

A termination step

_____

(4)

(ii) State **one** condition necessary for the initiation of this reaction.

_____

(1)

(b) Bromine-containing and chlorine-containing organic compounds may have a role in the decomposition of ozone in the upper atmosphere.

(i) Draw an appropriate **displayed formula** in the space provided to complete the following equation to show how $CBrF_3$ may produce bromine atoms in the upper atmosphere.

$$CBrF_3 \longrightarrow \quad + \quad Br^{\bullet}$$

_____

(1)

(ii) In the upper atmosphere, it is more likely for $CBrF_3$ to produce bromine atoms than it is for $CClF_3$ to produce chlorine atoms.

Suggest **one** reason for this.

_____

_____

_____

(1)

(iii) Bromine atoms have a similar role to chlorine atoms in the decomposition of ozone.

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The overall equation for the decomposition of ozone is

$$2O_3 \longrightarrow 3O_2$$

Write **two** equations to show how bromine atoms (Br•) act as a catalyst in the decomposition of ozone.

Explain how these two decomposition equations show that bromine atoms behave as a catalyst.

Equation 1

_____

Equation 2

_____

Explanation _____

_____

_____

(3)

(Total 10 marks)

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