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

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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

The refrigerant R410A, used in air conditioners, is a mixture of two fluoroalkanes, pentafluoroethane and difluoromethane.

(a) (i) The mechanism for the reaction of fluorine with either an alkane or a fluoroalkane is similar to that for the reaction of chlorine with methane.

Name the type of mechanism for the reaction of chlorine with methane.

_____

(1)

(ii) Write equations for the following steps in the mechanism for the reaction of fluorine with fluoromethane (CH_3F) to form difluoromethane (CH_2F_2).

Initiation step

_____

First propagation step

_____

Second propagation step

_____

A termination step leading to the formation of 1,2-difluoroethane.

_____

(4)

(iii) Write an overall equation for the reaction of fluorine with ethane to form pentafluoroethane (CF_3CHF_2) by this mechanism.

_____

(1)

(b) The refrigerant R112A (CCl_3CF_2Cl) has been banned because of concerns about ozone

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depletion.

Give the IUPAC name for CCl_3CF_2Cl

_____

(1)

(c) Nitrogen monoxide (NO) catalyses the decomposition of ozone into oxygen.

(i) Write the overall equation for this decomposition.

_____

(1)

(ii) Use the overall equation to deduce Step **3** in the following mechanism that shows how nitrogen monoxide catalyses this decomposition.

Step **1** $O_3 \longrightarrow O + O_2$

Step **2** $NO + O_3 \longrightarrow NO_2 + O_2$

Step **3** _____

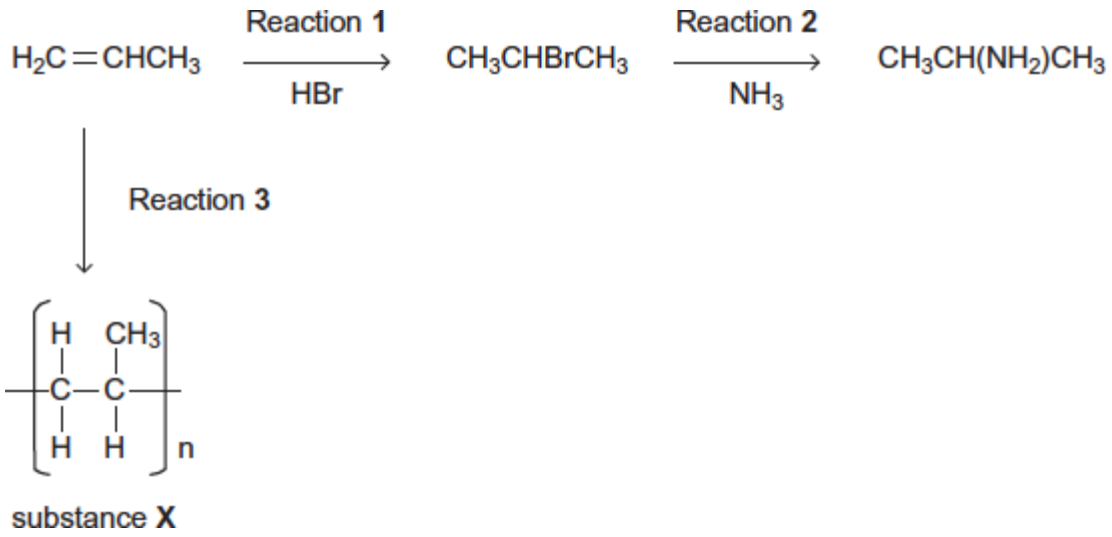
(1)

(Total 9 marks)

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Q2.

Consider the following reactions.



substance **X**

(a) Name and outline a mechanism for Reaction **1**.

Name of mechanism _____

Mechanism

(5)

(b) Name and outline a mechanism for Reaction **2**.

Name of mechanism _____

Mechanism

(5)

(c) State the type of reaction in Reaction **3**.
Give the name of substance **X**.

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_____

_____

_____

(2)

(d) The haloalkane produced in Reaction **1** can be converted back into propene in an elimination reaction using ethanolic potassium hydroxide.

$$CH_3CHBrCH_3 \xrightarrow{KOH} H_2C{=}CHCH_3$$

Outline a mechanism for this conversion.

(3)

(Total 15 marks)

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