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CHEMISTRY

ORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	HALOGENOALKANES
PAPER TYPE:	QUESTION PAPER - 4
TOTAL QUESTIONS	10
TOTAL MARKS	30

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Halogenoalkanes - 4

1. Draw the structure of the organic product with $M_r = 73$, made from the reaction between 2-bromobutane and ammonia.

(1)

2. In some refrigeration systems, CHF_3 has replaced CClF_3 because of concerns about ozone depletion.

(a) Identify the species formed from CClF_3 that is responsible for the catalytic decomposition of ozone in the upper atmosphere.

(1)

(b) Write an overall equation to represent the decomposition of ozone into oxygen.

(1)

3. Draw the structure of the alkene that would form 1,2-dibromo-3-methylbutane when reacted with bromine.

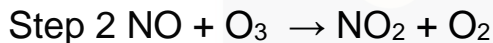
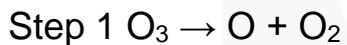
(1)

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

(a) Write the overall equation for this decomposition.

(1)

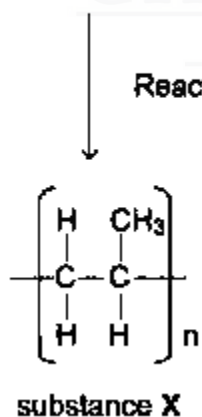
(b) Use the overall equation to deduce Step 3 in the following mechanism that shows how nitrogen monoxide catalyses this decomposition.



Step 3

(1)

5. Consider the following reactions.



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

(5)

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

(5)

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

(2)

6. 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.

(a) Name the type of mechanism for the reaction of chlorine with methane.

I am Sorry !!!!!

(1)

(b) 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

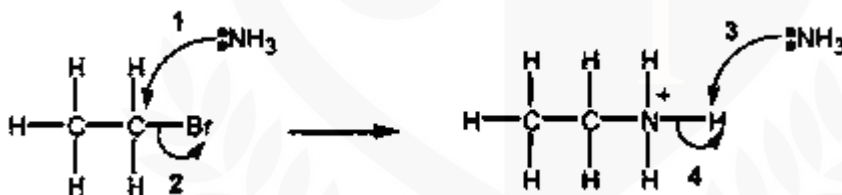
First propagation step

Second propagation step

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

(4)

7. This question is about a method that can be used to prepare ethylamine.



Which statement about the reaction is not correct?

- A. Ethylamine is a primary amine.
- B. The mechanism is a nucleophilic substitution.
- C. Using an excess of bromoethane will prevent further reaction to form a mixture of amine products.
- D. Ammonium bromide is an ionic compound.

(1)

8. Draw the structure of the alkene that has a peak, due to its molecular ion, at $m/z = 42$ in its mass spectrum.

(1)

9. A student read the following passage on the Internet.

Haloalkanes contain a polar covalent bond. The carbon atom of the polar covalent bond can be attacked by nucleophiles. Nucleophilic attack enables haloalkanes to undergo substitution reactions. A nucleophilic substitution reaction occurs when a haloalkane undergoes hydrolysis; the rate of hydrolysis of the haloalkane is influenced by the carbon–halogen bond enthalpy.

Explain the meaning of each of the following terms in the information given above.

(a) nucleophile

(1)

(b) substitution, as applied to nucleophilic substitution in a haloalkane

(1)

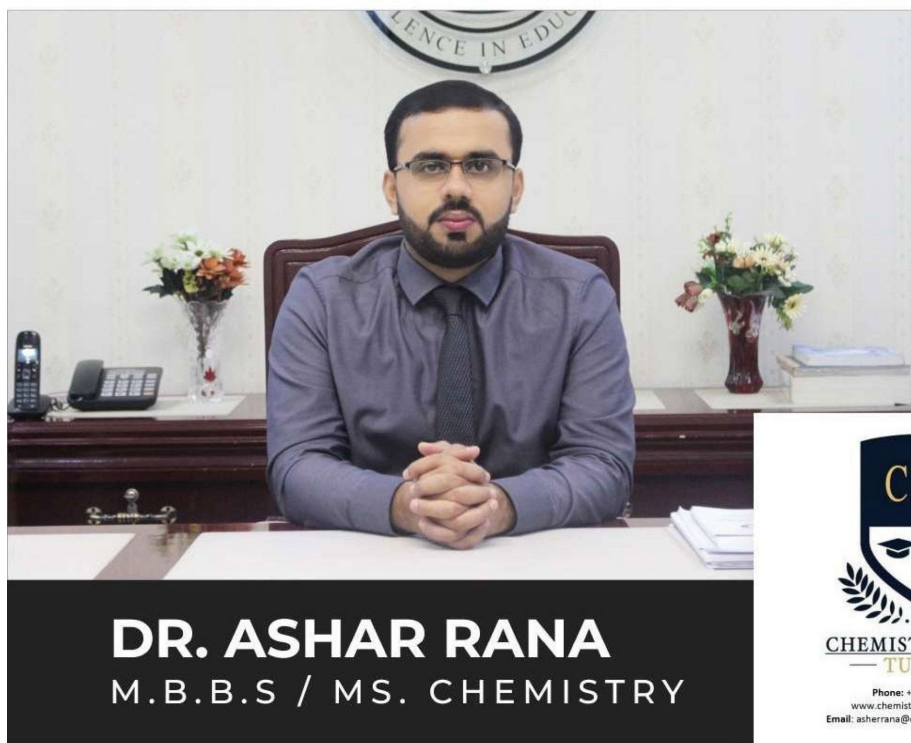
(c) hydrolysis

(1)

(d) bond enthalpy, as applied to a carbon–halogen bond.

(1)

10. Draw the structure of the alcohol with molecular formula $C_4H_{10}O$ that is resistant to oxidation by acidified potassium dichromate(VI).



- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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