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REVIEW QUESTION—HALO-COMPOUNDS –RX)

There are 4 isomers of C_4H_9Br.

(a) Draw them.

(b) Name them.

(c) All 4 structural isomers react with NH_3 in a similar way.

i. Give the name of the mechanism involved in these reactions with an isomer of your choice.

ii. Draw the structural formula of product formed and draw the mechanism of the reaction of this isomer with NH_3

iii. Select the isomer of molecular formula C_4H_9Br that would be the most reactive with NH_3. State the structural feature of your chosen isomer that makes it the most reactive of the isomers.

(d) The elimination of HBr from one of the isomers produces 2 structural isomers, compound A and B

i. Give the reagents and conditions required for this elimination reaction.

ii. Give the structural formulae of the two isomers, A and B, formed by elimination of HBr from one of the isomers.

(e) 1-Bromopropane can be converted into butanoic acid in a two stage process. Name suitable reagents for EACH stage of the conversion and calculate the percentage yield if 24.60 g of the halogen compound produces 8.80 g of the acid.

(f) Under EACH of the following categories, name a compound of your own choice which is used, or has been used, on a large scale as:

i. A pesticide.
ii. An aerosol propellant.
iii. A chlorinated solvent.

For each of the compounds chosen above, describe an adverse effect of its long term use or ready availability.

i.
ii.
iii.

(g) Iodomethane reacts with cyanide ions from sodium cyanide solution as follows:

$$CH_3I + CN^{-1} \text{ ----------> } CH_3CN + I^{-1}$$

The rate equation for this reaction is:
Rate = k $[CH_3I]$ $[CN^{-1}]$

i. Give the mechanism for the reaction and justify it on the basis of the rate equation.

ii. Give the reagents and conditions for a series of reactions by means of which iodomethane may be converted into methanoic acid.

(h) Explain, if any, reaction would be observed when chlorobenzene reacts with cold aqueous NaOH.