

SL & HL Questions on Halogenoalkanes & benzene

1. State the equation for the reaction of 1-bromopropane with warm dilute sodium hydroxide solution and name the organic product.
2.
 - i. Describe the difference between homolytic fission and heterolytic fission.
 - ii. State one example of a reaction where chloromethane undergoes homolytic fission and one example of a reaction where chloromethane undergoes heterolytic fission.
 - iii. State the equations for the two examples you have given in ii. and describe the necessary conditions for the reactions to occur.
3. When aqueous sodium hydroxide reacts with bromoethane the hydroxide ion acts as a nucleophile and the reaction is known as nucleophilic substitution.
 - i. Explain why hydroxide ions can act as nucleophiles.
 - ii. Explain why nucleophiles are attracted to carbon atoms bonded to bromine atoms.
 - iii. Explain why ammonia and cyanide ions can also act as good nucleophiles.
 - iv. When ammonia acts as a nucleophile it loses one of its hydrogen atoms as a hydrogen ion. Suggest the structure and also the class of product formed when ammonia reacts with bromoethane.
4. Cyclohexene, C_6H_{10} , consists of a six-membered carbon ring containing one double $C=C$ bond. Cyclohexene undergoes an addition reaction when it decolourises bromine water.
 - i. Write the equation for the reaction of cyclohexene with bromine and give the systematic (IUPAC) name of the product.
 - ii. Benzene does not decolourise bromine water but does react with bromine in the presence of a catalyst to form a substitution product in which one of the hydrogen atoms on the benzene ring is substituted by a bromine atom. Write the equation for this reaction and state the systematic (IUPAC) name of the product.
 - iii Explain why benzene does not readily undergo an addition reaction with bromine.