Section A

1. Complete the general formula of the alkenes.

   C___H____

2. Choose which of these is an alkene.

   Tick (✓) **one** box.

   A. Pentane ☐

   B. Hexene ☐

   C. Heptane ☐

3. Complete the structural formula for butene:

   C C C C

4. The alkenes are a large family of compounds.
   Determine the chemical formula of an alkene with:
   a. 8 carbons

      _____

   b. 24 carbons

      _____

   c. 36 hydrogens

      _____

   d. 20 hydrogens

      _____

5. What happens when bromine water is added to an alkene?

Tick (✓) **one** box.

A. Bromine water turns cloudy ☐

B. Bromine water turns colourless ☐

C. Bromine water stays orange ☐

6. Which explains why alkenes are described as unsaturated?

Tick (✓) **one** box.

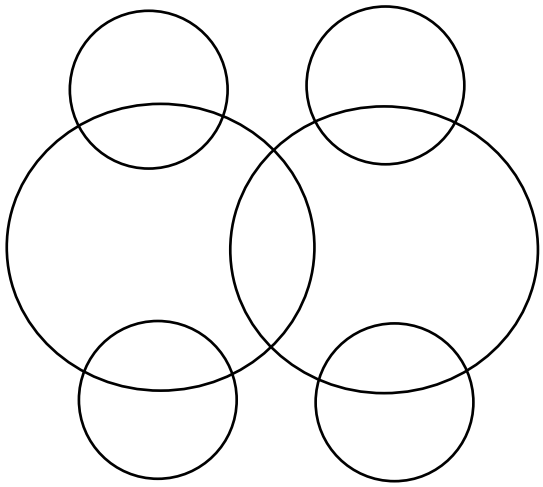
A. They contain a double bond between carbon atoms ☐

B. They contain a double bond between carbon and hydrogen atoms ☐

C. They contain only single bonds ☐

Section B

7. Complete the dot and cross diagram to show the bonding in ethene.



8. Predict the products of the following reactions.

a. Propene + hydrogen →

b. Pentene + hydrogen →

c. Hexene + hydrogen →

d. Propene + bromine →

e. Pentene + chlorine →

f. Hexene + iodine →

9. Describe what is required for an alkene to react with hydrogen.

10. Explain how alkenes are produced from crude oil using fractional distillation and cracking.

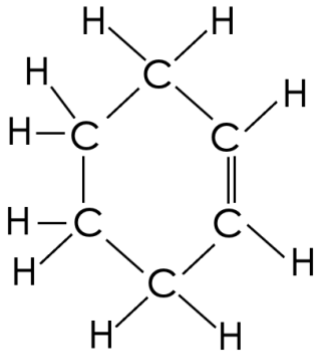
11. Cycloalkenes are alkenes that are ring-shaped and contain a double bond between carbon atoms.

The chemical formulae of three cycloalkenes are given below.

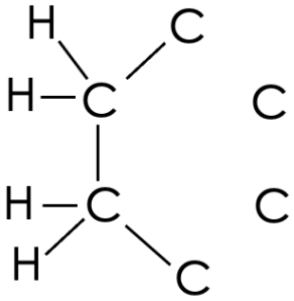
Name	**Formula**
Cyclobutene	C_4H_6
Cyclopentene	C_5H_8
Cyclohexene	C_6H_{10}

a. Use the information to determine the general formula of cycloalkenes.

The structural formula of cyclohexene is shown below.



b. Cyclohexene reacts with chlorine. Complete the structural formula to show the compound formed when cyclohexene reacts with chlorine.



Section C

12. Alkenes are a homologous series of hydrocarbons.
    a. Define a homologous series.
    b. Define a hydrocarbon.
    c. A scientist has a mixture of different alkenes. Describe and explain how they could separate them.
    d. Identify the type of bonding in alkenes.
    e. Explain why the alkenes have relatively low melting and boiling points.
    f. Hexene is an alkene that contains 6 carbon atoms. Describe what happens to the particles when hexene is heated past its boiling point.
    g. Hexene has a boiling point of 63 °C. What state is it in at room temperature?
    h. Hexene has a specific heat capacity of 183 J/kg °C. Calculate how much energy is required to heat 100 g of hexene from room temperature (20 °C) to its boiling point.