

Exercise walk-through

Alkenes ■ 11.5

eXercise

You must be able to

- describe alkenes as unsaturated ($\text{C}=\text{C}$) and reactive
- describe cracking and its products
- describe addition reactions and the test for unsaturation

Method — Cracking & the bromine water test

- H (Ni) $\rightarrow$ alkane; + steam (acid catalyst) $\rightarrow$ alcohol.

large alkane molecule



heat + catalyst



smaller alkane + alkene (C=C)

Method — Cracking & the bromine water test

shake with orange bromine water



alkene:
turns colourless



alkane:
stays orange

Bromine water decolourised by an alkene, unchanged by an alkane

Practice 2.1 ■ 1 mark

State the functional group in an alkene.

Solution 2.1

Worked steps

the C=C carbon–carbon double bond **B1**.

Practice 2.2 ■ 1 mark

State what cracking does.

Solution 2.2

Method: Cracking & the bromine water test

Worked steps

it breaks large alkane molecules into smaller, more useful molecules (alkanes and alkenes) **B1**.

Exam-style 3.1 ■ 1 mark

When ethene is shaken with bromine water, the bromine water:

A stays orange

B turns colourless

C turns blue

D turns purple

Solution 3.1

Method: Cracking & the bromine water test

A stays orange

B turns colourless



C turns blue

D turns purple

Worked steps

B. The alkene decolourises the bromine water.

Exam-style 3.2 ■ 1 mark

Cracking breaks decane ($\text{C}_{10}\text{H}_{22}$) into octane (C_8H_{18}) and one other product.

- (a) Name the type of compound formed as the other product.
- (b) Give the molecular formula of the other product.

Solution 3.2

Method: Cracking & the bromine water test

Worked steps

(a) an alkene **B1**.

(b) C_2H_4 **B1**.

Exam-style 3.3 ■ 2 marks

Describe how you could use bromine water to tell an alkene from an alkane.

Solution 3.3

Method: Cracking & the bromine water test

Worked steps

add bromine water to each and shake **M1**; the alkene turns it colourless while the alkane leaves it orange **A1**.