

GCSE Chemistry

Worksheet: Structure and formulae of alkenes

TIME 30 min	TOTAL 30 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Structure and formulae of alkenes

NAME _____

CLASS _____

DATE _____

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

0 1 . 1

Name the alkene with the molecular formula C_2H_4 .

.....

.....

.....

.....
[1 mark]

0 1 . 2

Explain why ethene is described as unsaturated.

.....

.....

[1 mark]

0 2

0 2 . 1

What is the general formula of the alkenes?

.....

.....

[1 mark]

0 2 . 2

Name the alkene with the formula C_3H_6 .

.....

.....

.....

.....

[1 mark]

0 2 . 3

Alkenes are described as unsaturated.
What does this mean?

.....

.....

[1 mark]

0 2 . 4

Draw the displayed formula of ethene, C_2H_4 .

.....

.....

.....

.....

[1 mark]

0 3

0 3 . 1

What is the general formula of the alkenes?

Tick (✓) **one** box.

C_nH_{2n}

C_nH_{2n+2}

C_nH_n

C_nH_{2n-2}

☐☐☐☐

[1 mark]

0 3 . 2

Name the functional group that all alkenes contain.

.....

.....

.....

.....

[1 mark]

0 4

0 4 . 1

Give the molecular formula of butene.

.....

.....

.....

.....

[1 mark]

0 4 . 2

Explain why butene is described as unsaturated.

.....

.....

[1 mark]

0 5

0 5 . 1

Give the molecular formula of ethene.

.....

.....

.....

.....

[1 mark]

0 5 . 2

Explain why ethene is described as unsaturated.

.....

.....

[1 mark]

0 6

0 6 . 1

Name the alkene with the molecular formula C_4H_8 .

.....

.....

.....

[1 mark]

0 6 . 2

Explain why butene is described as unsaturated.

.....

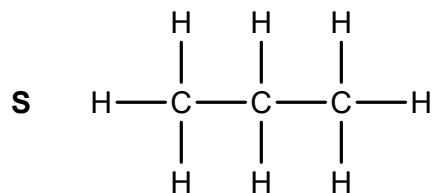
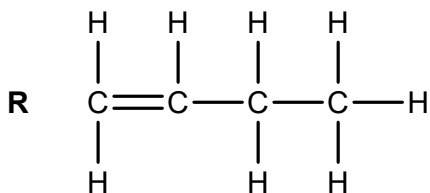
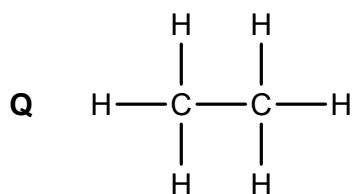
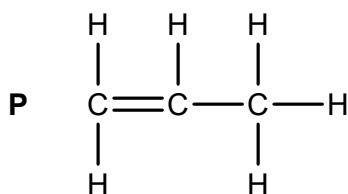
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[1 mark]

0 7

Figure 1 shows the displayed formulae of four hydrocarbons, P, Q, R and S.

Figure 1



0 7 . 1

Which **two** hydrocarbons are alkenes?

Tick (✓) **two** boxes.

P

☐

Q

☐

R

☐

S

☐

[2 marks]

0 7 . 2

Give the molecular formula of pentene.

.....

.....

.....

[1 mark]

0 7 . 3

Describe **two** differences between a molecule of propene and a molecule of propane.

[2 marks]

0 8

0 8 . 1

An alkene has 7 carbon atoms in each molecule.
Give its molecular formula.

[1 mark]

0 8 . 2

Which of these is the formula of an alkene?

Tick (✓) **one** box.

C_9H_{16}

C_9H_{20}

C_9H_9

C_9H_{18}

☐

☐

☐

☐

[1 mark]

0 8 . 3

Describe a test to show that a hydrocarbon is an alkene.
Give the result.

[2 marks]

0 9

A technician has two colourless liquids, one an alkane and one an alkene, but does not know which is which.

0 9 . 1

Describe a chemical test the technician could use to identify which liquid is the alkene, including the result expected.

[3 marks]

1 0

1 0 . 1

Explain, in terms of their structure, why alkenes are more reactive than alkanes.

[2 marks]

1	1
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Pent-1-ene and pent-2-ene are both alkenes with the molecular formula C_5H_{10} , but the $C=C$ double bond is in a different position in each.

1	1	.	1
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Explain why pent-1-ene and pent-2-ene are both classed as alkenes, and both fit the general formula C_nH_{2n} , even though their double bonds are in different positions.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Chemistry · Worksheet: Structure and formulae of alkenes · 30 marks

Question 1 (2 marks)

01.1 [1 mark]

Answer: Ethene

- ethene (1)
-

01.2 [1 mark]

Answer: It contains a carbon–carbon double bond (C=C).

- it contains a carbon–carbon double bond (C=C) (1)
-

Question 2 (4 marks)

02.1 [1 mark]

Answer: C_nH_{2n}

- C_nH_{2n} (1)
-

02.2 [1 mark]

Answer: Propene

- propene (1)
-

02.3 [1 mark]

Answer: They contain a carbon–carbon double bond.

- they contain a carbon–carbon double bond (C=C) / they have two fewer hydrogen atoms than the alkane with the same number of carbon atoms (1)
-

02.4 [1 mark]

Answer: Two carbon atoms joined by a double bond, each bonded to two hydrogen atoms.

- two C atoms joined by a double bond, each bonded to two H atoms (1)
-

Question 3 (2 marks)

03.1 [1 mark]

Correct: C_nH_{2n}

03.2 [1 mark]

Answer: Carbon–carbon double bond (C=C)

- carbon–carbon double bond (C=C) (1)
-

Question 4 (2 marks)

04.1 [1 mark]

Answer: C_4H_8

- C_4H_8 (1)
-

04.2 [1 mark]

Answer: It contains a carbon–carbon double bond (C=C).

- it contains a carbon–carbon double bond (C=C) (1)
-

Question 5 (2 marks)

05.1 [1 mark]

Answer: C_2H_4

- C_2H_4 (1)
-

05.2 [1 mark]

Answer: It contains a carbon–carbon double bond (C=C).

- it contains a carbon–carbon double bond (C=C) (1)
-

Question 6 (2 marks)

06.1 [1 mark]

Answer: Butene

- butene (1)
-

06.2 [1 mark]

Answer: It contains a carbon–carbon double bond (C=C).

- it contains a carbon–carbon double bond (C=C) (1)
-

Question 7 (5 marks)

07.1 [2 marks]

Correct: P; R

07.2 [1 mark]

Answer: C_5H_{10}

- C_5H_{10} (1)

07.3 [2 marks]

Answer: Propene has a C=C double bond, propane has only single bonds; propene has two fewer hydrogen atoms (C_3H_6 , not C_3H_8).

- propene has a C=C double bond but propane has only single bonds (1)
 - propene has two fewer hydrogen atoms (C_3H_6 compared with C_3H_8) (1)
-

Question 8 (4 marks)

08.1 [1 mark]

Answer: C_7H_{14}

- C_7H_{14} (1)

08.2 [1 mark]

Correct: C_9H_{18}

08.3 [2 marks]

Answer: Add bromine water and shake: it changes from orange to colourless.

- add bromine water (and shake) (1)
 - it changes from orange to colourless (1)
-

Question 9 (3 marks)

09.1 [3 marks]

Answer: Add a few drops of each liquid to separate samples of bromine water and shake. The liquid that turns the bromine water from orange to colourless is the alkene; the alkane causes no colour change.

- add a few drops of each liquid to separate samples of bromine water (and shake/mix) (1)
 - the alkene turns the bromine water from orange to colourless (1)
 - the alkane causes no colour change (the bromine water stays orange) (1)
-

Question 10 (2 marks)

10.1 [2 marks]

Answer: Alkenes have a reactive carbon–carbon double bond, which alkanes do not have; this double bond can open up and react with other atoms, so alkenes readily take part in addition reactions that alkanes cannot.

- alkenes contain a reactive carbon–carbon double bond ($C=C$), which alkanes do not have (1)
 - this double bond can break open, allowing other atoms to add across it (addition reactions), which saturated alkanes cannot undergo (1)
-

Question 11 (2 marks)

11.1 [2 marks]

Answer: Both have 5 carbon atoms and one $C=C$ double bond (10 hydrogen atoms), so both fit C_nH_{2n} with $n = 5$; the general formula only depends on the number of carbon atoms and double bonds, not on where the double bond is in the chain.

- both have 5 carbon atoms and exactly one $C=C$ double bond, giving 10 hydrogen atoms, fitting C_nH_{2n} with $n = 5$ (1)
 - the general formula depends only on the number of carbon atoms and double bonds present, not on the position of the double bond in the chain (1)
-