

GCSE Chemistry

Worksheet: Addition polymerisation

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Addition polymerisation

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

What name is given to the small molecules that join together to make a polymer?

.....

.....

.....

.....
[1 mark]

0 1 . 2

Name the polymer made from propene.

.....

.....

.....

.....
[1 mark]

0 1 . 3

What happens to the carbon–carbon double bond in the monomer during addition polymerisation?

Tick (✓) **one** box.

It stays a double bond

☐

It becomes a single bond, opening up to join to other monomers

☐

It becomes a triple bond

☐

It breaks the molecule into two smaller molecules

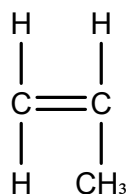
☐

[1 mark]

0 2

Figure 1 shows the displayed formula of propene.

Figure 1



0 2 . 1

Name the polymer made from propene.

.....

.....

.....

[1 mark]

0 2 . 2

Draw the repeating unit of the polymer made from propene.

.....

.....

.....

.....

.....

[2 marks]

0 3

0 3 . 1

What is a polymer?

.....

.....

[1 mark]

0 3 . 2

Name the polymer made from propene.

.....

.....

.....

.....

[1 mark]

0 3 . 3

Which functional group must a monomer have to form an addition polymer?

Tick (✓) **one** box.

C=C

☐

–OH

☐

–COOH

☐

–NH₂

☐

[1 mark]

0 3 . 4

In addition polymerisation, what else is formed as well as the polymer?

Tick (✓) **one** box.

Nothing else

☐

Water

☐

Hydrogen

☐

Carbon dioxide

☐

[1 mark]

0 4

0 4 . 1

What is the name of the addition polymer made from chloroethene?

.....

.....

.....

.....

[1 mark]

0 4 . 2

Which bond in the chloroethene molecule breaks when the monomers join together?

Tick (✓) **one** box.

The C–Cl bond

☐

One of the two bonds in the C=C double bond

☐

A C–H bond

☐

Every bond in the molecule

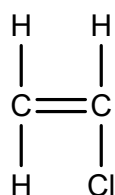
☐

[1 mark]

0 5

Figure 2 shows the displayed formula of chloroethene.

Figure 2



0 5 . 1

Name the polymer made from chloroethene.

.....

.....

.....

.....

[1 mark]

0 5 . 2

Draw the repeating unit of the polymer made from chloroethene.

.....

.....

.....

.....

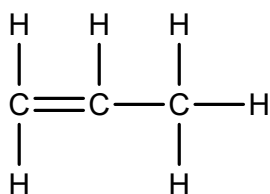
.....

[2 marks]

0 6

Poly(propene) is made from propene, $\text{CH}_2=\text{CHCH}_3$.

Figure 3



0 6 . 1

Draw the repeating unit of poly(propene).

.....

.....

.....

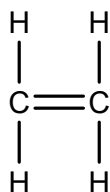
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[3 marks]

0 7

Figure 4 shows the displayed formula of ethene.

Figure 4



0 7 . 1

Draw the repeating unit of the polymer made from ethene.

.....

.....

.....

.....

.....

[3 marks]

0 7 . 2

Name the type of polymerisation used to make this polymer.

.....

.....

.....

.....

[1 mark]

0 8

1,1-difluoroethene, $\text{CH}_2=\text{CF}_2$, is an alkene monomer.

0 8 . 1

Draw the repeating unit of the addition polymer made from 1,1-difluoroethene.

.....

.....

.....

.....

[2 marks]

0 9

Poly(ethene) is an addition polymer made from ethene.

0 9 . 1

Explain why many addition polymers do not react with acids, bases or bromine water, and are very slow to break down naturally in the environment.

.....

.....

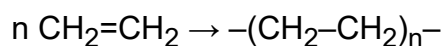
.....

.....

[2 marks]

1 0

Poly(ethene) is made from ethene.



1 0 . 1

Explain why the repeating unit of poly(ethene) has the same atoms as the monomer.

.....

.....

[1 mark]

1 0 . 2

A sample of poly(propene) has a relative formula mass (M_r) of 126 000.
Calculate the number of propene molecules, C_3H_6 , that joined to make one molecule of this polymer.
Relative atomic masses (A_r): H = 1 C = 12

.....

.....

.....

.....

.....

[2 marks]

1 0 . 3

Ethene decolourises bromine water but poly(ethene) does not.
Explain why.

.....

.....

.....

.....

[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: Addition polymerisation · 31 marks

Question 1 (3 marks)

01.1 [1 mark]

Answer: Monomers

- monomers (1)
-

01.2 [1 mark]

Answer: Poly(propene)

- poly(propene) (1)
-

01.3 [1 mark]

Correct: It becomes a single bond, opening up to join to other monomers

Question 2 (3 marks)

02.1 [1 mark]

Answer: Poly(propene)

- poly(propene) (1)
-

02.2 [2 marks]

Answer: Two carbon atoms joined by a single bond, carrying three hydrogen atoms and one CH₃ group, with bonds extending through brackets on both sides and n outside.

- two carbon atoms joined by a single bond (from the C=C of the monomer), with three hydrogen atoms and one CH₃ group attached (1)
 - bonds extending through brackets on both sides, with n outside the brackets (1)
-

Question 3 (4 marks)

03.1 [1 mark]

Answer: A very large molecule made from many small molecules (monomers) joined together.

- a very large molecule made from many small molecules (monomers) joined together (1)

03.2 [1 mark]

Answer: Poly(propene)

- poly(propene) (1)

03.3 [1 mark]

Correct: C=C

03.4 [1 mark]

Correct: Nothing else

Question 4 (2 marks)

04.1 [1 mark]

Answer: Poly(chloroethene)

- poly(chloroethene) (PVC) (1)

04.2 [1 mark]

Correct: One of the two bonds in the C=C double bond

Question 5 (3 marks)

05.1 [1 mark]

Answer: Poly(chloroethene)

- poly(chloroethene) (1)

05.2 [2 marks]

Answer: Two carbon atoms joined by a single bond, carrying three hydrogen atoms and one chlorine atom, with bonds extending through brackets on both sides and n outside.

- two carbon atoms joined by a single bond (from the C=C of the monomer), with three hydrogen atoms and one chlorine atom attached (1)
 - bonds extending through brackets on both sides, with n outside the brackets (1)
-

Question 6 (3 marks)

06.1 [3 marks]

Answer: Two carbon atoms joined by a single bond; one carbon has two H atoms, the other has one H atom and one CH₃ group; bonds through brackets with n.

- two carbon atoms joined by a single bond (from the C=C of the monomer) (1)
 - one carbon with two H atoms and the other with one H atom and one CH₃ group attached (1)
 - bonds extending through brackets on both sides, with n (1)
-

Question 7 (4 marks)

07.1 [3 marks]

Answer: Two carbon atoms joined by a single bond, carrying four hydrogen atoms, with bonds extending through brackets on both sides and n outside.

- two carbon atoms joined by a single bond (from the C=C of the monomer) (1)
 - the same atoms or groups attached as in the monomer: four hydrogen atoms (1)
 - bonds extending through brackets on both sides, with n outside the brackets (1)
-

07.2 [1 mark]

Answer: Addition (polymerisation)

- addition (polymerisation) (1)
-

Question 8 (2 marks)

08.1 [2 marks]

Answer: Two carbon atoms joined by a single bond; one carbon has two H atoms, the other has two F atoms; bonds through brackets with n.

- two carbon atoms joined by a single bond (1)
 - one carbon with two H atoms and the other with two F atoms, with bonds extending through brackets, with n (1)
-

Question 9 (2 marks)

09.1 [2 marks]

Answer: The repeat units are saturated (they have only strong C–C and C–H single bonds, with no reactive C=C double bond or other reactive functional group), so there is little for common reagents, or for microorganisms, to react with.

- the repeat units contain only strong, unreactive C–C and C–H single bonds, with no C=C double bond or other reactive functional group left after polymerisation (1)
 - so there is little for acids, bases, bromine water, or microorganisms in the environment to react with, meaning the polymer persists for a long time (1)
-

Question 10 (5 marks)

10.1 [1 mark]

Answer: No other product is formed in addition polymerisation.

- no other molecule / product is formed in addition polymerisation (1)
-

10.2 [2 marks]

Answer: 3000

- M_r of $C_3H_6 = 42$ (1)
 - $126\,000 \div 42 = 3000$ (1)
-

10.3 [2 marks]

Answer: Ethene has a C=C double bond; in poly(ethene) the double bonds have become single bonds.

- ethene has a C=C double bond (is unsaturated) (1)
 - in poly(ethene) the double bonds have become single bonds (it is saturated), so bromine cannot add (1)
-