

AQA - Synthetic and naturally occurring polymers – GCSE Chemistry

1. [May/2020/Paper_8462/2F/No.6.4-6.7](#)

Poly(propene) is produced from an alkene.

Complete the sentences.

[2 marks]

The name for very large molecules such as poly(propene) is _____.

The name of the alkene used to produce poly(propene) is _____.

The alkene needed to make poly(propene) is produced from crude oil.

Which **two** processes are used to produce this alkene from crude oil?

[2 marks]

Tick (✓) **two** boxes.

Chromatography

Cracking

Fermentation

Fractional distillation

Quarrying

What type of bond joins the atoms in a molecule of poly(propene)?

[1 mark]

Tick (✓) **one** box.

Covalent

Ionic

Metallic

Table 4 shows information about two polymers used to make plates.

Table 4

| Polymer | Effect of heating the polymer |
|----------|-------------------------------|
| A | does not melt |
| B | melts at 50 °C |

What type of polymer is polymer **A**?

Use **Table 4**.

[1 mark]

Why does polymer **A** behave differently to polymer **B** when heated?

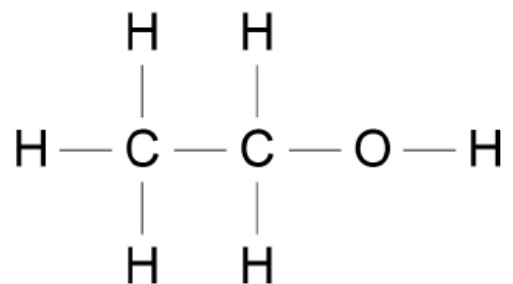
You should refer to crosslinks in your answer.

[1 mark]

2. [May/2020/Paper_8462/2F/No.7](#)

Figure 7 shows the displayed structural formula of ethanol.

Figure 7



Draw a circle on **Figure 7** around the alcohol functional group.

[1 mark]

An ethanol molecule contains atoms of three different elements.

Complete **Table 5** to show:

- the name of each element
- the symbol for each element
- the number of atoms of each element in one molecule of ethanol.

Use **Figure 7**.

[3 marks]

Table 5

| Name of element | Symbol for element | Number of atoms in one molecule of ethanol |
|-----------------|--------------------|--|
| Carbon | C | |
| Hydrogen | | 6 |
| | O | 1 |

Ethanol removes grass stains from clothes.

What type of substance is ethanol when used to remove grass stains?

[1 mark]

Tick (✓) **one** box.

A solute

A solution

A solvent

Wine contains ethanol.

Wine is produced from grape juice by fermentation.

Complete the sentence.

[1 mark]

Grape juice can be fermented to produce wine because

grape juice contains _____.

What is added to grape juice to cause fermentation?

[1 mark]

Ethanol reacts with ethanoic acid to produce an ester.

What is the name of the ester produced when ethanol reacts with ethanoic acid?

[1 mark]

Tick (✓) **one** box.

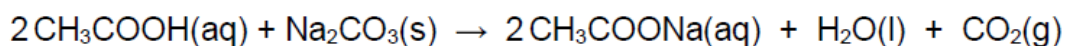
Ethane

Ethene

Ethyl ethanoate

Ethanoic acid reacts with sodium carbonate.

The equation for the reaction is:



What is the name of the liquid produced by this reaction?

[1 mark]

Vinegar is a solution that contains ethanoic acid.

400 cm³ of vinegar contains 20 g of ethanoic acid.

Calculate the mass of ethanoic acid in 1.0 dm³ of vinegar.

[3 marks]

Mass = _____ g

3. [May/2020/Paper_8462/2H/No.9.6](#)

The development and function of algae are controlled by a naturally occurring polymer.

Figure 7 represents the shape and structure of this polymer.

Figure 7



Describe the shape and structure of this polymer.

[3 marks]

4. [May/2019/Paper_8462/2F/No.5.6](#)

Suggest **two** advantages and **two** disadvantages of using addition polymers rather than wood to make surfboards.

Use **Table 3**.

[4 marks]

Advantages of addition polymers _____

Disadvantages of addition polymers _____

5. [May/2019/Paper_8462/2H/No.6](#)

Figure 5 shows a surfer on a surfboard.

Figure 5



Surfboards are made from polymers.

Surfboards have a poly(styrene) core and an outer skin.

Figure 6 shows the displayed structural formula of poly(styrene).

Figure 6

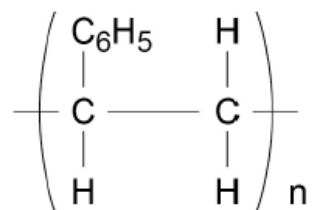
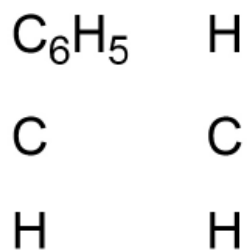


Figure 7 shows an incomplete displayed structural formula of the monomer styrene.

Complete **Figure 7**.

[2 marks]

Figure 7



The outer skin of surfboards contains a polyester.

Two monomers, **A** and **B**, are needed to make the polyester.

Figure 8 shows how these two monomers are represented.

Figure 8



Monomer **A**



Monomer **B**

Name the functional group in monomer **B**.

[1 mark]

Monomers **A** and **B** join together to produce a polyester and a small molecule.

Name the small molecule.

[1 mark]

Why does this type of polyester melt when it is heated?

[2 marks]

The outer skin of surfboards is a composite material.

The composite material contains glass fibres surrounded by a polyester.

Draw **one** line from each material to the description of that material.

[2 marks]

| Material | Description of the material |
|--------------|-----------------------------|
| Glass fibres | Hydrocarbon |
| Polyester | Matrix |
| | Monomer |
| | Polypeptide |
| | Reinforcement |

The outer skin makes the surfboard more expensive.

Suggest **two** reasons why an outer skin is added to the poly(styrene) core.

[2 marks]

1 _____

2 _____
