AQA – Organic chemistry – GCSE 2022 CS Chemistry

1. June/2022/Paper_8464/C/2F/No.2

0 2 This question is about fuels.

Coal deposits were formed from the remains of trees.

0 2 . 1 Name the process in the leaves of trees that uses carbon dioxide.

[1 mark]

_____

0 2 . 2 How is coal formed after trees die?

[1 mark]

Tick (✓) **one** box.

The trees are burned. ☐

The trees are compressed. ☐

The trees are melted. ☐

Coal contains small amounts of sulfur.

0 2 . 3 Name the gas produced when sulfur burns in oxygen.

[1 mark]

_____

0 2 . 4 Give **two** problems caused by the gas produced when sulfur burns in oxygen.

[2 marks]

1 _____

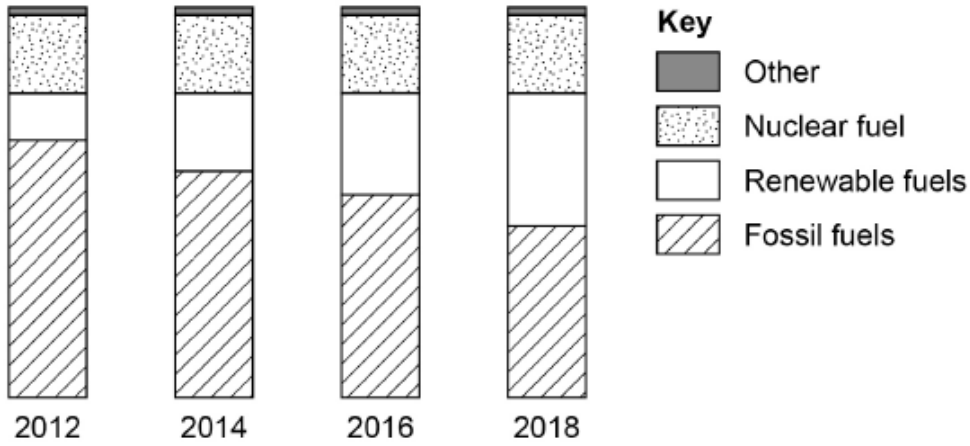
_____

2 _____

_____

0 2 . 5 **Figure 4** shows the relative amount of electricity generated from different fuel sources in the UK from 2012 to 2018.

Figure 4



Describe what happens to the amounts of fuels used to generate electricity in the UK from 2012 to 2018.

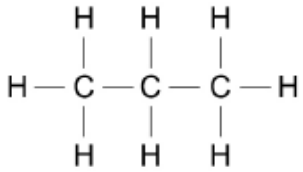
[3 marks]

2. June/2022/Paper_8464/C/2F/No.5

0 5 This question is about hydrocarbons.

Figure 9 shows a hydrocarbon.

Figure 9



0 5 . 1 Complete the formula for the hydrocarbon shown in **Figure 9**.

[1 mark]

C_____H_____

0 5 . 2 What is the name of the hydrocarbon in **Figure 9**?

[1 mark]

_____

0 5 . 3 Which homologous series does the hydrocarbon in **Figure 9** belong to?

[1 mark]

_____

0 5 . 4 30 g of another hydrocarbon contains 24 g of carbon.

Which calculation gives the percentage of carbon in the hydrocarbon?

[1 mark]

Tick (✓) **one** box.

$\frac{24 \times 30}{100}$ ☐

$\frac{100 \times 30}{24}$ ☐

$\frac{24 \times 100}{30}$ ☐

$\frac{24}{30 \times 100}$ ☐

0 5 . 5 **Table 3** shows boiling points of some hydrocarbons.

Table 3

Formula of hydrocarbon	Boiling point in °C
C_2H_6	–89
C_4H_{10}	0
C_6H_{14}	69
C_8H_{18}	125
$C_{10}H_{22}$	174

Describe how the boiling points change as the number of carbon atoms in the hydrocarbon increases.

[1 mark]

Hydrocarbons can be cracked.

0 5 . 6 Give **one** condition used to crack hydrocarbons.

[1 mark]

_____

_____

0 5 . 7 Balance the equation for the cracking of C_6H_{14}

[1 mark]

$$C_6H_{14} \rightarrow C_2H_6 + \_\_\_\_\_ C_2H_4$$

0 5 . 8 Give **one** reason why hydrocarbons are cracked.

[1 mark]

_____

_____

0 5 . 9 Window frames can be manufactured from wood or plastic.

Table 4 shows the results of a life cycle assessment (LCA) for making one wooden and one plastic window frame.

Both window frames are the same size.

Table 4

Table 4 not reproduced here due to third-party copyright restrictions

Give **three** advantages of using wood instead of plastic in the manufacture of window frames.

[3 marks]

Advantage of wood 1 _____

_____

_____

Advantage of wood 2 _____

_____

_____

Advantage of wood 3 _____

_____

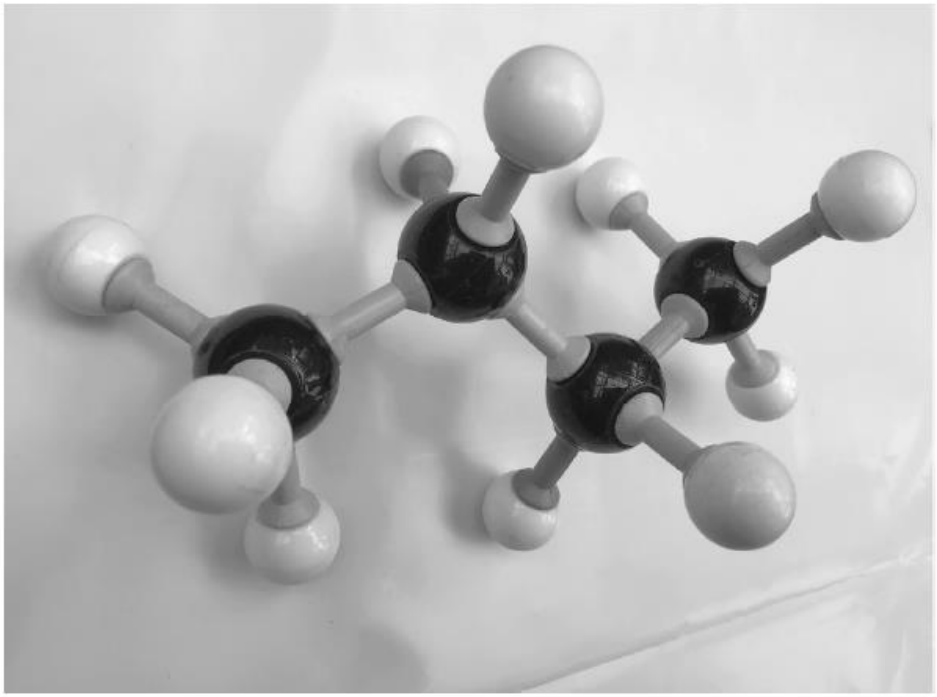
_____

3. June/2022/Paper_8464/C/2H/No.4

0 4 This question is about hydrocarbons and the uses of hydrocarbons.

0 4 . 1 **Figure 6** shows a model of an alkane.

Figure 6



What is the name of the alkane in **Figure 6**?

[1 mark]

0 4 . 2 What is a hydrocarbon?

[1 mark]

Large hydrocarbon molecules are cracked.

0 4 . 3 When $C_{11}H_{24}$ is cracked, three products are formed.

Complete the equation for the reaction.

[2 marks]

$$C_{11}H_{24} \rightarrow C_5H_{10} + 2 \_\_\_\_\_ + \_\_\_\_\_$$

0 4 . 4 Explain why **one** of the products of cracking is in high demand.

[2 marks]

0 4 . 5 Window frames can be manufactured from wood or from plastic.

Table 2 shows data from a life cycle assessment (LCA) for a wooden window frame and a plastic window frame.

Both window frames are the same size.

Table 2

	Wood	Plastic
Sources of hydrocarbons used for production in kg	5.37	18.23
Greenhouse gases released during production, use and disposal in kg equivalent of CO_2	457	487
Oxides of nitrogen and sulfur dioxide produced in arbitrary units	29.6	37.7
Waste materials in kg	16.5	28.8
Total energy consumption in production, use and disposal in MJ	9150	9713
Lifetime cost to customer to buy and maintain in £	147	102

Evaluate the sustainability of wooden and plastic window frames.

You should include environmental and economic factors.

[6 marks]