

0 6

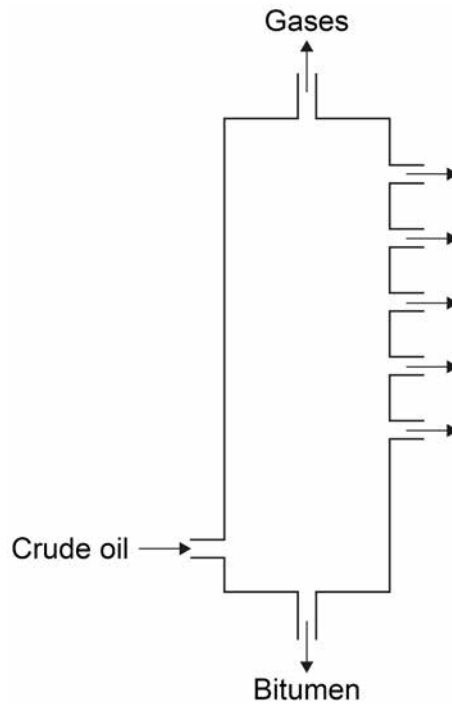
Crude oil is a mixture of hydrocarbons.

0 6 . 1

The hydrocarbons in crude oil are separated into fractions by fractional distillation.

Figure 13 shows a fractional distillation column.

Figure 13



Crude oil vapour passes up the column.

Complete the sentence.

Choose the answer from the box.

[1 mark]

condenses

dissolves

freezes

melts

Each fraction \_\_\_\_\_ at a different level.



**0 6 . 2** Why do the fractions separate?

**[1 mark]**

Tick **one** box.

The fractions have different boiling points.

The fractions have different flammability.

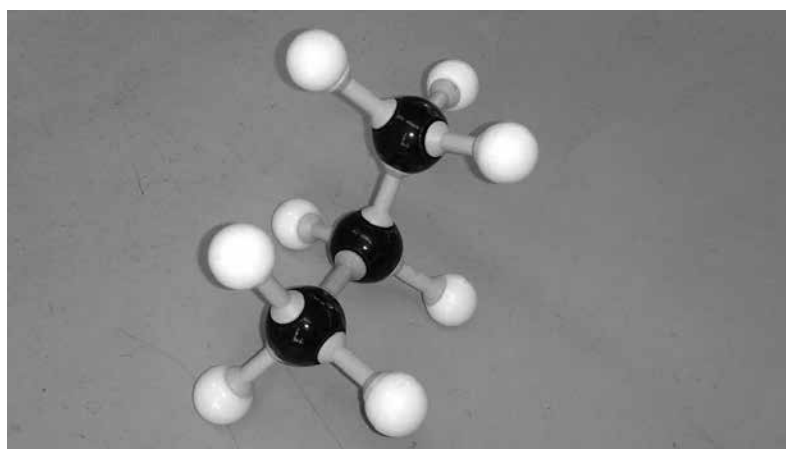
The fractions have different melting points.

The fractions have different viscosity.

Most of the hydrocarbons in crude oil are alkanes.

**0 6 . 3** **Figure 14** represents an alkane molecule.

**Figure 14**



Name the alkane.

**[1 mark]**

---

**Turn over ►**



0 6 . 4 Methane (CH<sub>4</sub>) is an alkane.

What is the general formula for alkanes?

[1 mark]

Tick **one** box.

C<sub>n</sub>H<sub>n</sub>

C<sub>n</sub>H<sub>2n</sub>

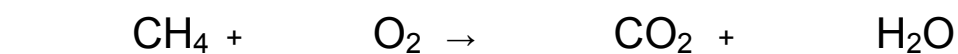
C<sub>n</sub>H<sub>2n-2</sub>

C<sub>n</sub>H<sub>2n+2</sub>

0 6 . 5 Alkanes burn in oxygen.

Balance the equation for methane burning.

[1 mark]



0 6 . 6 Ethene is an alkene.

Which reagent is used to test for alkenes?

[1 mark]

Tick **one** box.

Anhydrous copper sulfate

Bromine water

Damp litmus paper

Limewater



**Table 6** shows data from a life cycle assessment (LCA) for the disposal of 10 000 biodegradable plastic bags.

**Table 6**

	Burning and using the energy to generate electricity	Landfill
Mass of carbon dioxide produced in kg	25	15
Mass of solid residue in kg	0.050	0.070
Mass of sulfur dioxide produced in kg	0.20	0.30

**0 6 . 7** Why are life cycle assessments (LCA) done?

**[1 mark]**

---



---

**0 6 . 8** Compare the **two** methods for the disposal of biodegradable plastic bags.

Use information from **Table 6**

**[4 marks]**

---



---



---



---



---



---



---



---



---



---



Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	condenses		1	AO1 5.7.1.2
06.2	the fractions have different boiling points		1	AO1 5.7.1.2 5.7.1.3
06.3	propane	do <b>not</b> accept propene	1	AO2 5.7.1.1
06.4	$C_nH_{2n+2}$		1	AO1 5.7.1.1
06.5	$CH_4 + 2 O_2 \rightarrow CO_2 + 2 H_2O$	allow multiples	1	AO2 5.1.1.1 5.7.1.3
06.6	bromine water		1	AO1 5.7.1.4
06.7	to assess the environmental impact (of the stages in the life of a product)	allow to see the effect / harm / damage on the Earth / environment / planet  ignore references to energy, pollution, carbon footprint, carbon dioxide, sustainability	1	AO1 5.10.2.1

Question	Answers	Mark	AO / Spec. Ref.
<b>06.8</b>	<b>Level 2:</b> Scientifically relevant features are identified; the ways in which they are similar / different is made clear and the magnitude of the similarity / difference noted.	3–4	AO3
	<b>Level 1:</b> Relevant features are identified and differences noted.	1–2	AO2
	<b>No relevant content</b>	0	
	<b>Indicative content</b> <ul style="list-style-type: none"> <li>• burning 10 000 bags produces 10 kg more of carbon dioxide than landfill</li> <li>• putting 10 000 bags in landfill produces 0.02 kg more of solid residue than burning.</li> <li>• putting 10 000 bags in landfill produces 50% more sulfur dioxide than burning</li> <li>• burning 10 000 bags produces 25 kg of carbon dioxide, but landfill only produces 15 kg</li> <li>• putting 10 000 bags in landfill produces 0.07 kg of solid residue but burning only produces 0.05 kg</li> <li>• landfill produces less carbon dioxide than burning</li> <li>• landfill produces more solid residue than burning</li> <li>• burning produces less sulfur dioxide than landfill</li> </ul>		5.10.2.1 5.10.2.2 5.9.2.2
<b>Total</b>		<b>11</b>	