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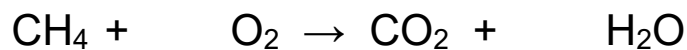
The combustion of fuels is a source of atmospheric pollutants.

0 5 . 1

Methane is a fuel.

Balance the equation for the combustion of methane.

[1 mark]



0 5 . 2

Many fuels are mixtures.

Petrol and diesel are mixtures of hydrocarbons.

Table 4 shows properties of petrol and of diesel.

Table 4

	Petrol	Diesel
Range of number of carbon atoms in a hydrocarbon molecule	4 to 12	12 to 20
Range of boiling points in °C	40 to 205	250 to 350

Compare the properties of petrol and diesel.

Use **Table 4**.

[2 marks]

Turn over ►



0 5 . 3 The gases released when a fuel is burned in car engines may include:

- oxides of nitrogen
- carbon monoxide
- water vapour.

Which chemical element do all these gases contain?

[1 mark]

Tick (✓) **one** box.

Carbon

Hydrogen

Nitrogen

Oxygen

0 5 . 4 When diesel burns in car engines, oxides of nitrogen are produced.

Where does the nitrogen come from?

[1 mark]

0 5 . 5 When diesel burns, particulates may be produced.

What environmental effect do particulates from burning diesel cause?

[1 mark]



0 5 . 6 Carbon monoxide may be produced when diesel burns.

Give **one** reason why carbon monoxide is difficult to detect.

[1 mark]

0 5 . 7 Explain why water vapour and **not** liquid water is produced when diesel burns.

[2 marks]

0 5 . 8 Sulfur is a common impurity in diesel.

Explain why this causes an environmental problem.

[3 marks]

12

Turn over for the next question

Turn over ►



Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	$\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$		1	AO2 5.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	hydrocarbon molecules in petrol have fewer carbon atoms than those in diesel petrol has a lower boiling point (range) than diesel	allow converse throughout allow petrol is more flammable than diesel allow petrol is less viscous than diesel	1 1	AO3 5.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	oxygen		1	AO1 5.8.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	air	allow the atmosphere allow from volcanoes	1	AO1 5.9.1.1 5.9.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	global dimming		1	AO2 5.9.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(carbon monoxide is) colourless or (carbon monoxide is) odourless	ignore clear	1	AO1 5.9.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	(diesel) burns at a high temperature or (diesel) burns at a temperature greater than 100 °C		1	AO2
	(which is) above the boiling point of water		1	AO3 5.2.2.1 5.9.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.8	sulfur dioxide (is produced when diesel is burnt)		1	AO1 5.9.3.1 5.9.3.2
	(which causes) acid rain		1	
	(which results in) any one from:		1	
	<ul style="list-style-type: none"> • damage to buildings / statues / bridges • damage to trees / plants • damage to aquatic life • acidification of lakes / rivers / soil • respiratory problems 	allow (which affects) asthma		

Total Question 5	12
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