

## C12 The Earth's Atmosphere Homework task 2

### Q1.

Industries use the Earth's resources to produce useful products.

Copper is produced from copper ore and from recycling waste copper.

- (a) The energy needed to produce 1 kg of copper from copper ore is 70 MJ.

The energy needed to produce 1 kg of recycled copper is 27 MJ.

Calculate the energy saved if 100 kg of copper is produced from recycled copper and **not** from copper ore.

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Energy saved = \_\_\_\_\_ MJ

(3)

- (b) Producing copper from recycling waste copper reduces emissions of sulfur dioxide.

Why is reducing emissions of sulfur dioxide important?

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(1)

- (c) Copper is used to make coins.

A coin of mass 8 g contains 75% copper.

Calculate the mass of copper in the coin.

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Mass of copper = \_\_\_\_\_ g

(2)

(d) Iron and glass are both produced from the Earth's resources.

Some processes can reduce the use of limited resources.

Draw **one** line from the description of the process to the name of the process.

Description of process	Name of process
	Extraction
Scrap steel is added to iron from a blast furnace	Quarrying
	Reacting
A glass bottle is refilled	Recycling
	Reusing

(2)

(e) Life cycle assessments are used to assess the environmental impact of producing iron nails and glass bottles.

There are four stages, **A**, **B**, **C** and **D**, in a life cycle assessment. The stages are **not** in the correct order.

Stage **A** Disposal

Stage **B** Extracting and processing raw materials

Stage **C** Manufacturing and packaging

Stage **D** Use and operation

What is the correct order of stages **A**, **B**, **C**, and **D**?

Tick (✓) **one** box.

**C, D, B, A**

**D, B, C, A**

**B, C, D, A**

(1)

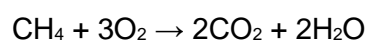
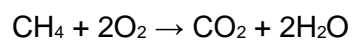
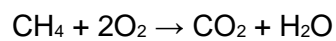
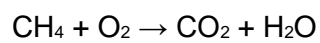
(Total 9 marks)

**Q2.**

- (a) Methane is burned in a plentiful supply of oxygen.

Which is the correct balanced chemical equation?

Tick **one** box.



(1)

- (b) Burning fuels causes atmospheric pollution.

Write **one** effect for each pollutant in **Table 1**.

**Table 1**

<b>Pollutant</b>	<b>Effect</b>
Carbon monoxide	
Sulfur dioxide	
Particulates	

(3)

(c) Methane, petrol and coal are fuels.

**Table 2** shows information about these fuels.

**Table 2**

Fuel	State	Energy content in kJ per g	Mass in mg of CO <sub>2</sub> produced for one kJ of energy released
Methane	Gas	52	53
Petrol	Liquid	43	71
Coal	Solid	24	93

Evaluate the use of the fuels.

Use in the information in **Table 2** and your knowledge.

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(6)  
(Total 10 marks)

## HIGHER TIER QUESTIONS

### Q3.

This question is about atmospheric pollutants from fuels.

- (a) Fuel burns in a car engine.

Describe how oxides of nitrogen are produced in a car engine.

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(2)

- (b) The table shows the carbon footprint during the manufacture and use of three cars.

Car	Mass of CO <sub>2</sub> produced during manufacture in kg	Mass of CO <sub>2</sub> produced when driving in kg per km	Total mass of CO <sub>2</sub> produced from manufacture and 40 000 km driving in kg	Total mass of CO <sub>2</sub> produced from manufacture and 100 000 km driving in kg
Car A	14 000	0.123	18 920	26 300
Car B	20 000	0.085	23 400	28 500
Car C	23 000	0.044	24 760	27 400

Evaluate the carbon footprint of the cars.

Use information from the table above.

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(6)

(Total 8 marks)

**Q4.**

This question is about pollutants.

- (a) Waste water has harmful substances removed before being released into the environment.

Complete the sentences.

Agricultural waste water requires the removal of harmful \_\_\_\_\_.

Industrial waste water may require the removal of harmful \_\_\_\_\_.

(2)

- (b) How is sewage sludge treated before being released into the environment?

Tick (✓) **one** box.

Aerobic biological treatment

Anaerobic digestion

Grit removal

Screening

(1)

- (c) Hydrocarbons are used to make polymers. Polymers are used to make plastic bags.

In one year 8.0 billion plastic bags were used.

The next year there was a charge for plastic bags and only 1.3 billion plastic bags were used.

Calculate the percentage decrease in the number of plastic bags used.

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Percentage decrease = \_\_\_\_\_ %

(3)

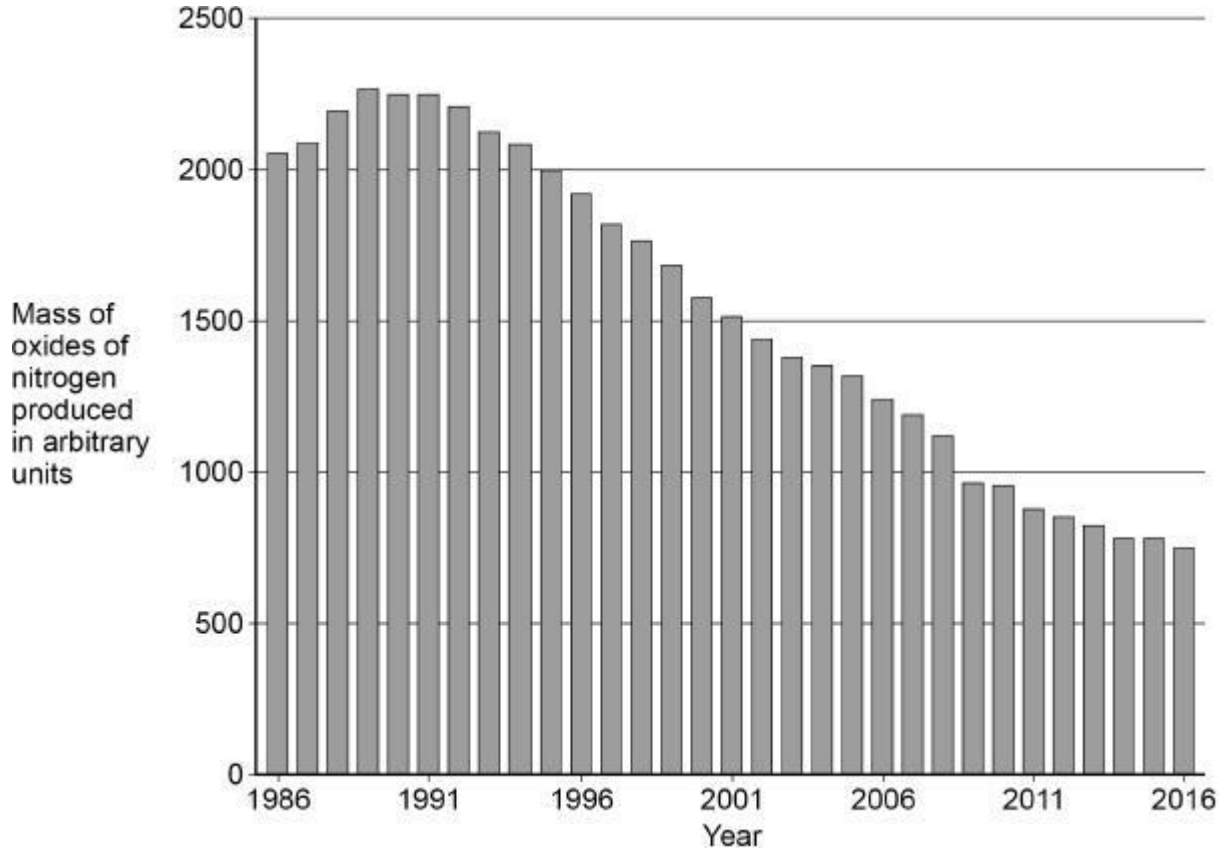
Oxides of nitrogen are pollutants formed in car engines.

(d) Give **one** problem oxides of nitrogen cause.

\_\_\_\_\_

(1)

(e) The graph below shows the mass of oxides of nitrogen produced from car engines from 1986 to 2016.



Suggest why the mass of oxides of nitrogen produced from car engines increased and then decreased.

Increased \_\_\_\_\_

\_\_\_\_\_

Decreased \_\_\_\_\_

\_\_\_\_\_

(2)

(Total 9 marks)