Paper 1

Questions are applicable for both core and extended candidates

1 Some information about gas X is listed.

- It is not present in clean, dry air.
- It is not a cause of respiratory problems.
- It is responsible for global warming.

What is X?

A carbon dioxide

B carbon monoxide

C methane

D nitrogen dioxide

2 What are the **main** products obtained by the fractional distillation of liquid air?

A carbon dioxide and oxygen

B carbon dioxide and water vapour

C nitrogen and oxygen

D nitrogen and water vapour

3 In which reaction is the rate of reaction increased by light?

A carbon dioxide + water → glucose + oxygen

B ethanoic acid + sodium carbonate → sodium ethanoate + water + carbon dioxide

C ethene + bromine → dibromoethane

D methane + oxygen → carbon dioxide + water

4 Which substance is beneficial to aquatic life?

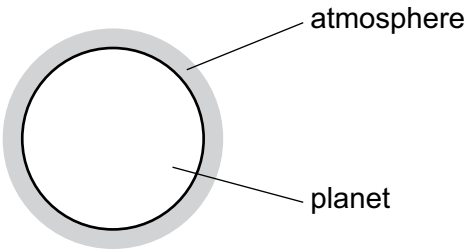
A dissolved oxygen

B phosphates

C plastics

D sewage

5 A new planet has been discovered and its atmosphere has been analysed.



The table shows the composition of its atmosphere.

gas	percentage by volume
carbon dioxide	4
nitrogen	72
oxygen	24

Which gases are present in the atmosphere of the planet in a higher percentage than they are in the Earth's atmosphere?

A carbon dioxide and oxygen

B carbon dioxide only

C nitrogen and oxygen

D nitrogen only

6 Which statement is correct?

A Atmospheric carbon dioxide is not a cause of climate change.

B Atmospheric methane is produced by respiration.

C Burning natural gas decreases the level of carbon dioxide in the atmosphere.

D Decomposition of vegetation causes an increase in atmospheric methane.

7 A plastic combusts to form sulfur dioxide, SO_2, and hydrogen chloride, HCl.

How could both gases be removed from the air?

A Pass the gases over solid anhydrous cobalt(II) chloride.

B Pass the gases over solid damp calcium oxide.

C Pass the gases through a catalytic converter.

D Pass the gases through filter paper.

8 Which information about carbon dioxide and methane is correct?

		carbon dioxide	methane
A	formed when vegetation decomposes	✓	✗
B	greenhouse gas	✓	✓
C	present in unpolluted air	✗	✗
D	produced during respiration	✗	✓

key
✓ = correct
✗ = not correct

9 Which process produces methane?

A combustion of hydrocarbons

B decomposition of vegetation

C respiration

D reaction between hydrochloric acid and calcium carbonate

10 Which substance in polluted air damages stonework and kills trees?

A carbon dioxide

B carbon monoxide

C lead compounds

D sulfur dioxide

11 What is the approximate volume of nitrogen in 200 cm^3 of air?

A 20 cm^3 **B** 40 cm^3 **C** 80 cm^3 **D** 160 cm^3

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

12 How do carbon dioxide and methane cause global warming? **(extended only)**

A They emit the thermal energy they have absorbed back to the Earth.

B They absorb the radiation directly from the Sun.

C They increase thermal energy loss to space.

D They reduce reflection of thermal energy from the Earth's surface.

13 Some combustion reactions produce pollutant gases.

Which reactions produce a pollutant gas that is **not** present in clean air?

1 $2CH_4 + 3O_2 \rightarrow 2CO + 4H_2O$

2 $2H_2 + O_2 \rightarrow 2H_2O$

3 $C + O_2 \rightarrow CO_2$

4 $N_2 + O_2 \rightarrow 2NO$

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

14 What is the equation for photosynthesis? **(extended only)**

A $CO_2 + 3H_2 \rightarrow CH_3OH + H_2O$

B $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

C $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$

D $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$

15 Which statement describes how the C–H bonds in methane gas in the atmosphere contribute to global warming? **(extended only)**

A They absorb thermal energy from the Sun and emit some of this energy into space.

B They absorb thermal energy from the Sun and emit all of this energy towards the Earth.

C They absorb thermal energy from the Earth and emit all of this energy towards the Earth.

D They absorb thermal energy from the Earth and emit some of this energy towards the Earth.

16 Catalytic converters in car exhausts change polluting gases into non-polluting gases.

Which statements about oxides of nitrogen and car engines are correct? **(extended only)**

1 The nitrogen in oxides of nitrogen comes from compounds in gasoline.

2 The oxygen in oxides of nitrogen comes from the air in the car engine.

3 Catalytic converters convert oxides of nitrogen into nitrogen.

A 1 and 2 **B** 2 and 3 **C** 2 only **D** 3 only

17 Which statement is correct?

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