



ST ANDREW'S SECONDARY SCHOOL

NAME

CLASS

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DATE

CHEMISTRY



Self-Assessment Topical Test

30 minutes

The Atmosphere and Environment

INSTRUCTIONS

Write your name, class and date on the spaces provided above.

Complete **all** questions on this question paper.

You are reminded to revise this topic first before attempting the questions.

MARKS OBTAINED
25

Multiple-Choice Questions

[10 marks]

- Which of the following noble gases has the highest percentage composition in the air?

A Argon	B Helium
C Neon	D Xenon

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- Which of the following is obtained industrially from the fractional distillation of air?

A Ethene	B Hydrogen
C Oxygen	D Sulfur dioxide

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- Which of the following statements about the ozone layer is true?

A It is a pollutant in the stratosphere.
B It absorbs some of the ultraviolet radiation from the Sun.
C Excess greenhouse gases can cause its depletion.
D It is destroyed when fluorine atoms react with the ozone molecules.

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- Which of these chemicals can be used to test for the presence of sulfur dioxide in polluted air?

A Aqueous acidified potassium manganate(VII)
B Anhydrous copper(II) sulfate
C Aqueous hydrogen peroxide
D Limewater

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- Which of the following is **not** a source of sulfur dioxide?

A Combustion of coal	B Combustion of crude oil
C Lightning activity	D Volcanic eruption

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- Which of the following about nitrogen dioxide is true?

A It is a greenhouse gas.
B It is produced when plant and animal matter decay.
C It is released during complete combustion of petrol.
D It causes acid rain.

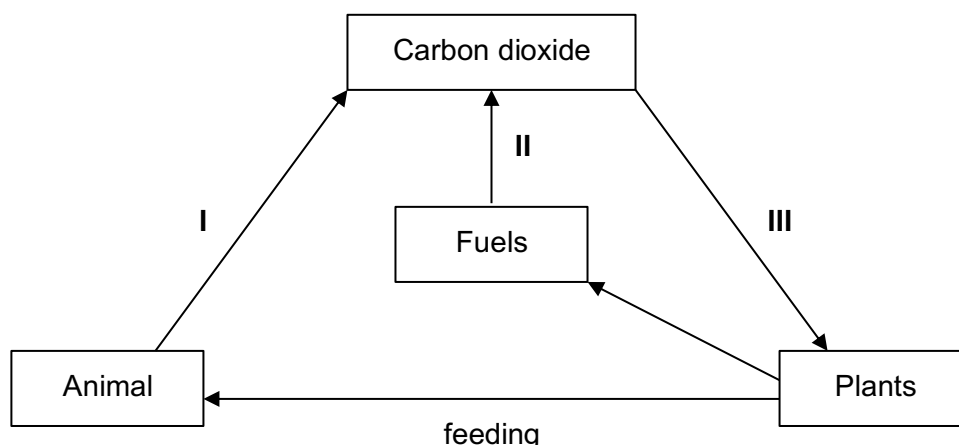
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- 7 Which of the following is **not** a harmful effect of carbon monoxide?
A It causes headaches.
B It causes breathing difficulties.
C It causes cancer.
D It causes death. ()
- 8 It was found that cars which were parked near a coal-fired power station often corroded more quickly. Which gas, when present in above average levels in the air, is a possible cause?
A Carbon dioxide **B** Ozone
C Sulfur dioxide **D** Water vapour ()
- 9 Which of the following gases does **not** affect the pH of water?
A Carbon dioxide **B** Carbon monoxide
C Nitrogen dioxide **D** Sulfur dioxide ()
- 10 Which of the following pollutants is the main cause of the greenhouse effect?
A Carbon dioxide **B** Chlorofluorocarbons (CFCs)
C Ozone **D** Sulfur dioxide ()

Structured Questions

[15 marks]

- 11 A simplified version of the carbon cycle is shown below.



Identify processes I, II and III.

[3]

I _____

II _____

III _____

- 12 Exhaust fumes from the internal combustion engines of motor vehicles contribute to the poor quality of air in large cities. These exhaust fumes contain air pollutants such as carbon monoxide and nitrogen dioxide.

(a) Explain how the following pollutants are formed in an internal combustion engine.

(i) Carbon monoxide

[1]

(ii) Nitrogen dioxide [2]

(b) Describe two harmful effects of nitrogen dioxide. [2]

13 When coal burns, nitrogen monoxide may be formed. One way to reduce the level of nitrogen monoxide in the flue gases of coal-fired power stations is to inject natural gas (methane) into the boiler just above the flame. This reaction converts nitrogen monoxide to nitrogen, carbon dioxide and water.

(a) Write a balanced chemical equation for the reaction between methane (CH_4) and nitrogen monoxide (NO). [2]

(b) (i) Name an air pollutant formed during the incomplete combustion of methane. [1]

(ii) Explain how this air pollutant affects human health. [1]

(c) (i) Write a balanced chemical equation to show how nitrogen monoxide may oxidise carbon monoxide to carbon dioxide. [1]

(ii) Explain how excess atmospheric carbon dioxide can lead to global warming. [2]
