

Interpreting and Interacting with Earths Systems (F)

1. Which statement describes the **advantages** of instrumental methods of analysis?

- A Instruments can analyse very small amounts and carry out the analyses slowly.
- B Instruments are very accurate and use large amounts of substances.
- C Instruments are very accurate and carry out the analyses slowly.
- D Instruments are very accurate and can run all the time.

Your answer

[1]

2. Which type of water is **potable** water?

- A Groundwater
- B Seawater
- C Tap water
- D Waste water

Your answer

[1]

3. How was the Earth's early atmosphere formed?

- A Animals breathing
- B Global warming
- C Plants growing
- D Volcanic activity

Your answer

[1]

4 (a). Many scientists believe that increasing amounts of carbon dioxide in the Earth's atmosphere are causing global warming.

- i. Write down **one** way that carbon dioxide is **released** into the atmosphere.

----- [1]

- ii. Write down **one** way to **reduce** the amount of carbon dioxide that is released into the atmosphere.

----- [1]

(b). Sulfur dioxide is a pollutant found in many large cities.

Sulfur dioxide is an **acidic** gas.

- i. Suggest a value for the pH of sulfur dioxide.

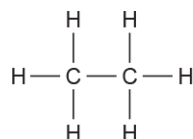
----- [1]

- ii. Describe **one** problem caused by sulfur dioxide.

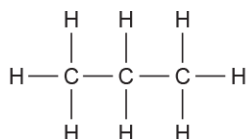
----- [1]

5. This question is about compounds of carbon.

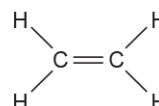
Look at the displayed formulae of ethane, propane and ethene.



Ethane

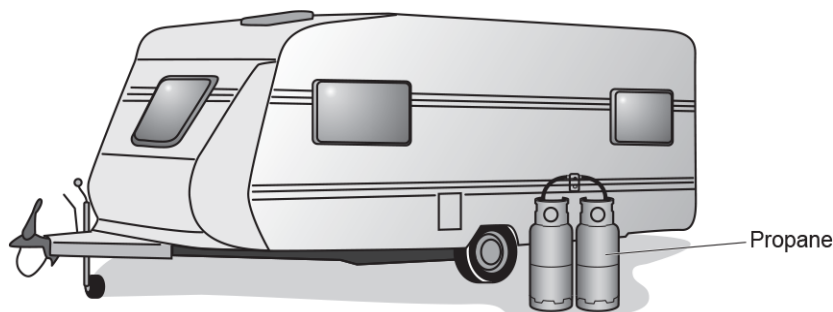


Propane



Ethene

* Propane gas is used as a fuel for cooking and heating in caravans.



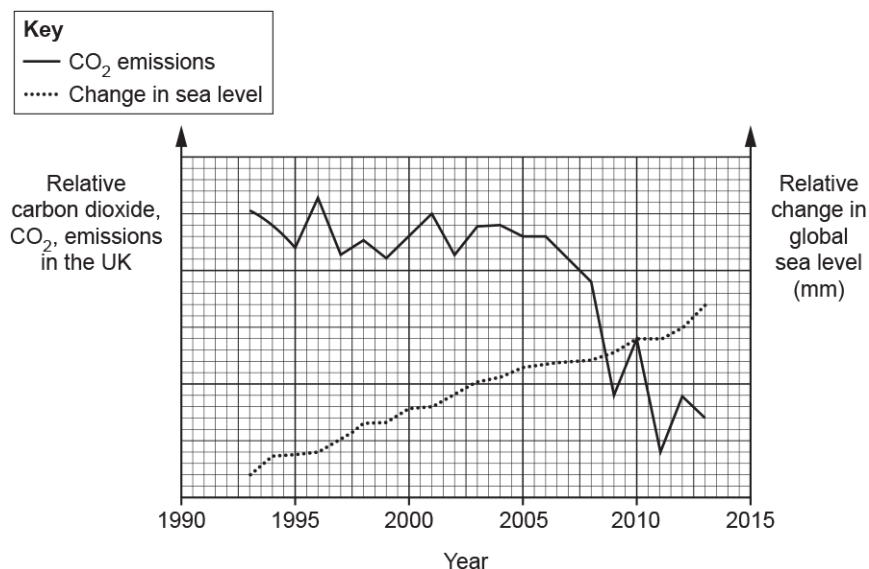
Incomplete combustion of propane can occur if the campers do not take sensible precautions.

7 (a). Some scientists believe that the increased burning of fossil fuels has contributed to global warming.

The scientists say that global warming is causing ice to melt, which results in sea levels rising.

Other scientists believe that rises in global temperatures are just natural variations.

The graph shows the carbon dioxide, CO₂, emissions by fossil fuels in the UK and the changes in global sea levels between 1993 and 2013.



Evaluate the information shown in the graph.

To what extent does the graph support a link between human activity and global warming?

[3]

(b). There are problems with using information about **CO₂ emissions by fossil fuels** to draw conclusions about the effect of carbon dioxide emissions on **global** sea levels.

Suggest what these problems are.

[2]

(c).

- i. Describe **one** effect on the Earth's climate of increased carbon dioxide levels, other than rising sea levels.

----- [1]

- ii. Suggest how we can lower carbon dioxide levels.

----- [1]

8 (a). Carbon dioxide is one of several greenhouse gases.

It is made by the combustion of fossil fuels such as coal, gas and oil.

Look at the table. It shows the amount of carbon dioxide produced in a large city between the years 2010 and 2016.

| Source of carbon dioxide | Carbon dioxide produced (tonnes) | | Percentage increase (%) |
|--------------------------|----------------------------------|-----------|-------------------------|
| | in 2010 | in 2016 | |
| Homes | 500 000 | 600 000 | 20 |
| Factories and industry | 500 000 | 750 000 | 50 |
| Transport | 1 000 000 | 1 000 000 | 0 |
| Electricity generation | 750 000 | 900 000 | |

Look at the row for electricity generation.

Calculate the percentage increase of carbon dioxide produced.

Percentage increase = % [2]

(b). Analyse the data in the table.

What is the ratio of carbon dioxide produced from **Homes** to **Electricity generation** for 2016?

----- [2]

9. Ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$, is a fertiliser.

Ammonium sulfate can be manufactured from ammonia and sulfuric acid.

Sulfuric acid is manufactured in a series of steps.

Step 1:

Sulfur is burnt in oxygen to produce sulfur dioxide.

Step 2, The Contact Process:

Sulfur dioxide is reacted with oxygen to produce sulfur trioxide. This takes place in the presence of vanadium(V) oxide at a pressure of 2 atmospheres and at about 450°C .

Step 3:

Sulfur trioxide is reacted with water to produce sulfuric acid.

Write balanced symbol equations for each stage of this process.

[4]

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The population of the city increased between 2010 and 2016.

The carbon dioxide produced from Transport has not changed between 2010 and 2016.

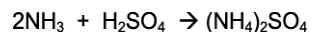
Why has the carbon dioxide production from Transport remained the same?

Give **two** conclusions.

[2]

11. Ammonium sulfate is a salt.

It is manufactured using the reaction between the alkali ammonia and sulfuric acid.



What type of reaction is this?

----- [1]

12. In some remote islands, drinking water is made from sea water.

What is the name of the process for making drinking water from sea water?

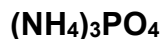
- A. chlorination
- B. distillation
- C. filtration
- D. sedimentation

Your answer

[1]

13. Ammonium phosphate is used as a fertiliser.

The formula for ammonium phosphate is:



Which elements in ammonium phosphate are **essential elements** for plant growth?

- A. nitrogen and hydrogen
- B. nitrogen and phosphorus
- C. hydrogen and oxygen
- D. phosphorus and oxygen

Your answer

[1]

END OF QUESTION PAPER