

Air and Water – 2022 IGCSE

1. *June/2022/Paper_11/No.31*

Fertilisers are used to provide three of the elements needed for plant growth.

Which two compounds would give a fertiliser containing all three of these elements?

- A $\text{Ca}(\text{NO}_3)_2$ and $(\text{NH}_4)_2\text{SO}_4$
- B $\text{Ca}(\text{NO}_3)_2$ and $(\text{NH}_4)_3\text{PO}_4$
- C KNO_3 and $(\text{NH}_4)_2\text{SO}_4$
- D KNO_3 and $(\text{NH}_4)_3\text{PO}_4$

2. *June/2022/Paper_11/No.32*

Which process produces methane?

- A combustion of hydrocarbons
- B decomposition of vegetation
- C respiration
- D reaction between hydrochloric acid and calcium carbonate

3. *June/2022/Paper_12/No.29*

Which row identifies a substance present in clean air and a substance that is a pollutant in air?

| | present in clean air | pollutant in air |
|---|----------------------|------------------|
| A | oxides of nitrogen | nitrogen |
| B | carbon dioxide | sulfur dioxide |
| C | carbon monoxide | lead compounds |
| D | nitrogen | argon |

4. *June/2022/Paper_12/No.31*

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5. June/2022/Paper_13/No.29

Carbon dioxide and methane are both greenhouse gases.

Which activity produces both of these gases?

- A farming animals
- B cracking alkanes
- C the thermal decomposition of limestone
- D using petrol-powered cars

6. June/2022/Paper_13/No.31

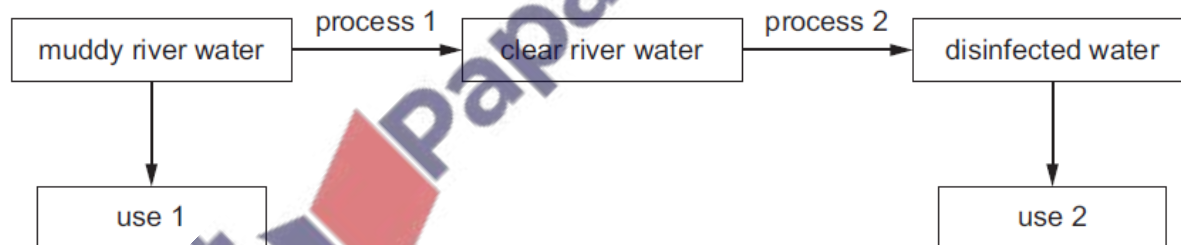
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7. June/2022/Paper_21/No.29

The diagram shows the uses and treatment processes of muddy river water.



Which row identifies uses 1 and 2 and processes 1 and 2?

| | use 1 | use 2 | process 1 | process 2 |
|----------|----------------|----------------|--------------|--------------|
| A | drinking | watering crops | chlorination | filtration |
| B | drinking | watering crops | filtration | chlorination |
| C | watering crops | drinking | chlorination | filtration |
| D | watering crops | drinking | filtration | chlorination |

8. June/2022/Paper_21/No.31

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9. June/2022/Paper_22/No.31

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10. June/2022/Paper_22/No.32

Which processes produce carbon dioxide?

- 1 respiration
- 2 photosynthesis
- 3 fermentation
- 4 combustion of hydrogen

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

11. June/2022/Paper_23/No.31

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Which two compounds would give a fertiliser containing all three of these elements?

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12. June/2022/Paper_23/No.32

Which processes produce carbon dioxide?

- 1 respiration
- 2 photosynthesis
- 3 fermentation
- 4 combustion of hydrogen

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

13. March/2022/Paper_12/No.30

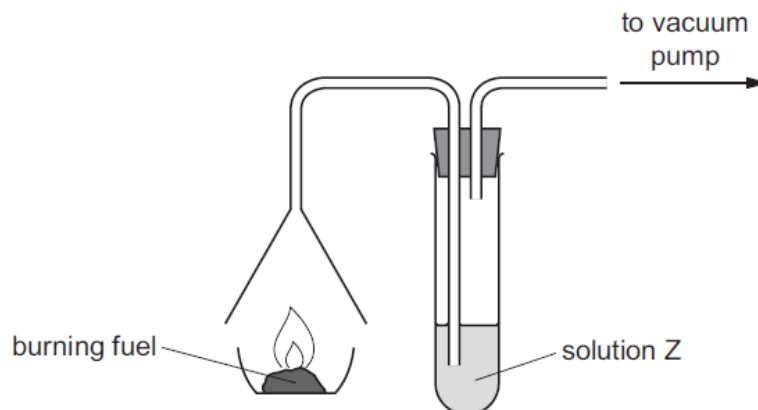
Which row describes the colour changes when water is added to anhydrous cobalt(II) chloride and anhydrous copper(II) sulfate?

| | anhydrous cobalt(II) chloride | anhydrous copper(II) sulfate |
|---|-------------------------------|------------------------------|
| A | blue to pink | white to blue |
| B | blue to white | blue to pink |
| C | pink to blue | blue to white |
| D | white to blue | pink to blue |

14. March/2022/Paper_12/No.31

The gases produced by a burning fuel are passed through solution Z using the apparatus shown.

The fuel contains compounds of sulfur.



Which row identifies solution Z and the result obtained when the fuel contains compounds of sulfur?

| | solution Z | result |
|---|------------------------------------|------------------|
| A | acidified potassium manganate(VII) | turns colourless |
| B | acidified potassium manganate(VII) | turns purple |
| C | litmus | bleached |
| D | litmus | turns blue |

15. March/2022/Paper_12/No.32

Which information about carbon dioxide and methane is correct?

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

key

✓ = correct

x = not correct

16. March/2022/Paper_22/No.29

Ammonia is produced using the Haber process.

Which row shows the source of the raw materials and the reaction conditions?

| | source of nitrogen | source of hydrogen | temperature /°C | pressure /atm |
|----------|--------------------|--------------------|-----------------|---------------|
| A | air | hydrocarbons | 200 | 200 |
| B | hydrocarbons | air | 450 | 2 |
| C | air | hydrocarbons | 450 | 200 |
| D | air | hydrocarbons | 450 | 2 |

17. March/2022/Paper_22/No.32

Which information about carbon dioxide and methane is correct?

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

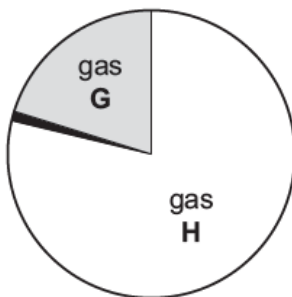
key

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This question is about air.

(a) The pie chart shows the proportions of the main gases in clean, dry air.



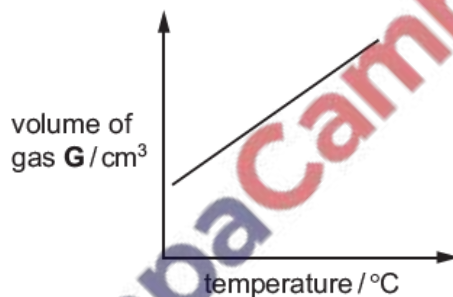
(i) Name the gases **G** and **H**.

gas **G**

gas **H**

[2]

(ii) The graph shows how the volume of a sample of gas **G** changes as temperature increases. The pressure is kept constant.



Describe how the volume of gas **G** changes as temperature increases.

..... [1]

(iii) There is a small percentage of noble gases in the air. The noble gases are unreactive.

Explain why the noble gases are unreactive in terms of their electronic structure.

.....
..... [1]

(iv) Describe the arrangement and separation of the particles in a gas.

arrangement

separation

[2]

(b) Two of the pollutants in air are oxides of nitrogen and lead compounds.

(i) Give one effect of each of these pollutants on health.

oxides of nitrogen

lead compounds

[2]

(ii) Name two other pollutants present in air.

State the source of each of these pollutants.

pollutant 1

source of pollutant 1

pollutant 2

source of pollutant 2

[4]

[Total: 12]

