

GCSE CHEMISTRY

Chemistry Test 4: Organic chemistry and Chemistry of the atmosphere (Foundation)

Total number of marks: 35

0 2

This question is about fuels.

0 2 . 3

Oxygen is needed to burn fuels.

Name the source of the oxygen needed to burn fuels.

[1 mark]

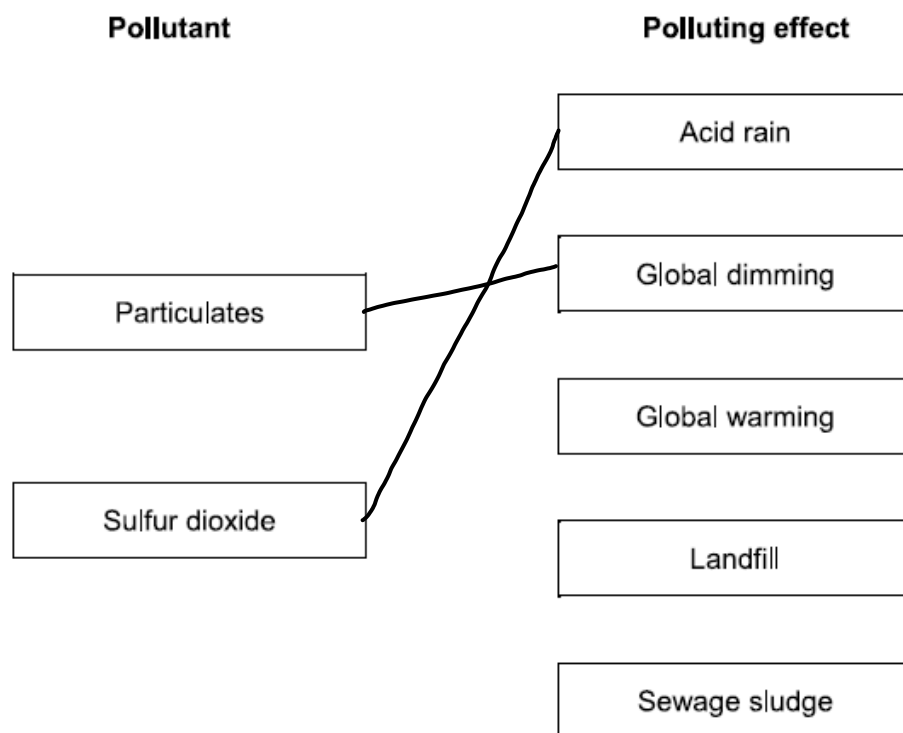
air

0 2 . 4

Particulates and sulfur dioxide are pollutants produced when some fuels burn.

Draw **one** line from each pollutant to the polluting effect.

[2 marks]



0 2 . 5 Which **two** gases are produced when fuels burn in car engines?

[2 marks]

Tick **two** boxes.

- | | |
|-----------------|-------------------------------------|
| Ammonia | <input type="checkbox"/> |
| Carbon dioxide | <input checked="" type="checkbox"/> |
| Carbon monoxide | <input checked="" type="checkbox"/> |
| Nitrogen | <input type="checkbox"/> |
| Oxygen | <input type="checkbox"/> |

0 2 . 6 Vehicles produce most of the atmospheric pollution in cities.

How could the atmospheric pollution in cities be reduced?

[2 marks]

Tick **two** boxes.

- | | |
|--------------------------------|-------------------------------------|
| Build more roads in cities | <input type="checkbox"/> |
| Build new car factories | <input type="checkbox"/> |
| Develop fuel efficient engines | <input checked="" type="checkbox"/> |
| Make car tax cheaper | <input type="checkbox"/> |
| Use electric cars | <input checked="" type="checkbox"/> |

0 6

This question is about materials used to make plates.

Plates are made from ceramics, paper or poly(propene).

Poly(propene) is produced from an alkene.

0 6 . 3

Complete the sentences.

[2 marks]

The name for very large molecules such as poly(propene) is polymer.

The name of the alkene used to produce poly(propene) is propene.

0 6 . 4

The alkene needed to make poly(propene) is produced from crude oil.

Which **two** processes are used to produce this alkene from crude oil?

[2 marks]

Tick (✓) **two** boxes.

Chromatography

Cracking

Fermentation

Fractional distillation

Quarrying

0 6 . 5

What type of bond joins the atoms in a molecule of poly(propene)?

[1 mark]

Tick (✓) **one** box.

Covalent

Ionic

Metallic

0 4

Titan is a moon of the planet Saturn.

Table 2 shows the percentages of some gases in the atmosphere of Titan and in the atmosphere of the Earth.

Table 2

Gas	Percentage of gas in atmosphere (%)	
	Titan	Earth
Nitrogen	98	78
Oxygen	Zero	21
Methane	1.4	0.0002
Argon	0.14	0.9
Carbon dioxide	0.0001	0.04

0 4 . 1

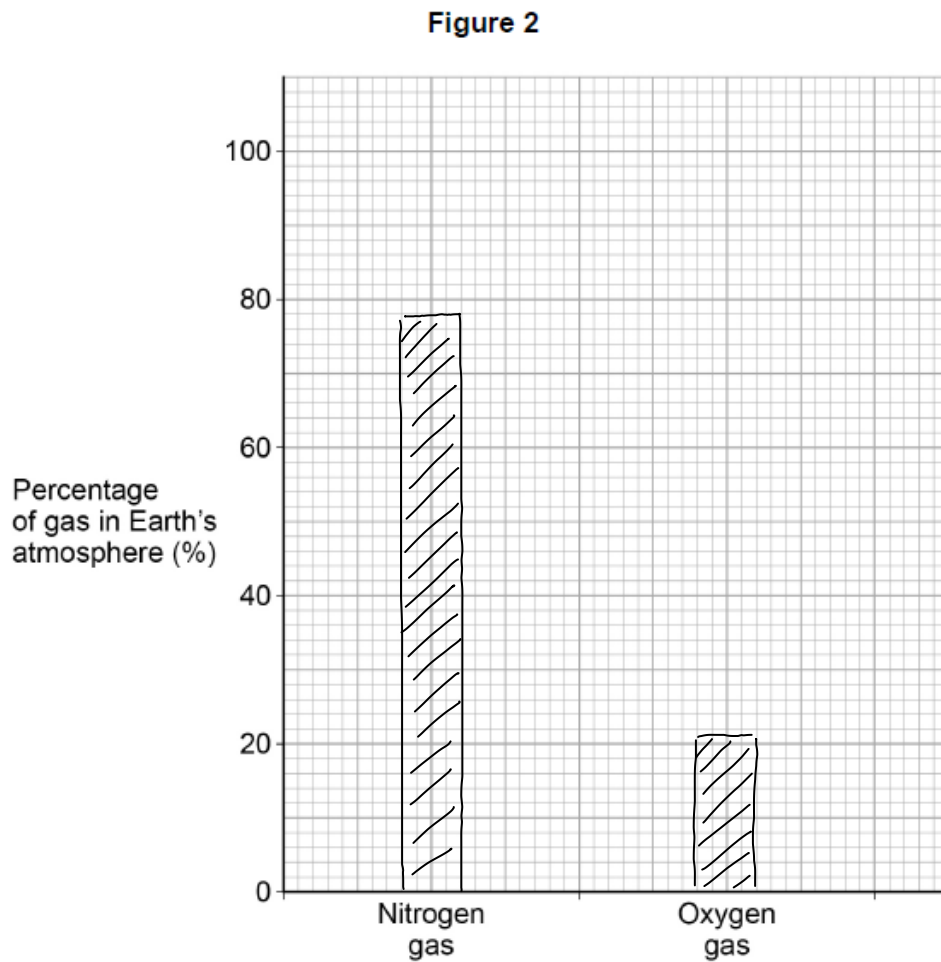
Which **two** gases are present in smaller percentages on the Earth than on Titan?

[1 mark]

nitrogen and methane

- 0 4 . 2** Complete the bar chart in **Figure 2** to show the percentages of nitrogen gas and oxygen gas in the Earth's atmosphere.

[2 marks]



- 0 4 . 3** Why are algae less likely to photosynthesise on Titan than Earth?

Use **Table 2**.

[1 mark]

Tick (✓) **one** box.

Titan's atmosphere contains too little argon.

Titan's atmosphere contains too little carbon dioxide.

Titan's atmosphere contains too little methane.

Titan's atmosphere contains too little nitrogen.

0 4 . 4 Titan is warmer than the other moons of Saturn because of the greenhouse effect.

How do greenhouse gases trap energy from the sun?

[1 mark]

Tick (✓) **one** box.

All wavelengths of radiation are reflected back to the surface of Titan.

Long wavelength radiation is reflected back to the surface of Titan.

Short wavelength radiation is reflected back to the surface of Titan.

0 7

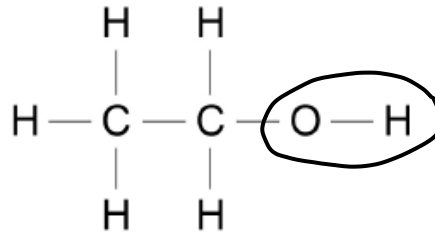
This question is about ethanol and ethanoic acid.

Ethanol is an alcohol.

0 7 . 1

Figure 7 shows the displayed structural formula of ethanol.

Figure 7



Draw a circle on **Figure 7** around the alcohol functional group.

[1 mark]

Wine contains ethanol.

Wine is produced from grape juice by fermentation.

0 7 . 4

Complete the sentence.

[1 mark]

Grape juice can be fermented to produce wine because

grape juice contains glucose.

0 7 . 5

What is added to grape juice to cause fermentation?

[1 mark]

yeast

0 7 . 6 Ethanol reacts with ethanoic acid to produce an ester.

What is the name of the ester produced when ethanol reacts with ethanoic acid?

[1 mark]

Tick (✓) **one** box.

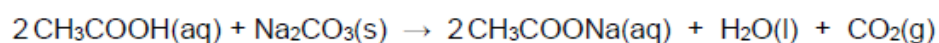
Ethane

Ethene

Ethyl ethanoate

0 7 . 7 Ethanoic acid reacts with sodium carbonate.

The equation for the reaction is:



What is the name of the liquid produced by this reaction?

water

[1 mark]

0 7 . 8 Vinegar is a solution that contains ethanoic acid.

400 cm³ of vinegar contains 20 g of ethanoic acid.

Calculate the mass of ethanoic acid in 1.0 dm³ of vinegar.

[3 marks]

$$400 \text{ cm}^3 = \left(\frac{400}{1000} \right) \text{ dm}^3$$

$$= 0.4 \text{ dm}^3$$

$$\frac{20}{0.4} \times 1 = 50 \text{ g}$$

Mass = 50 g

1 0

This question is about hydrocarbons.

Hexane and hexene are hydrocarbons containing six carbon atoms in each molecule.

Hexane is an alkane and hexene is an alkene.

1 0 . 1

Draw **one** line from each hydrocarbon to the formula of that hydrocarbon.

[2 marks]

Hydrocarbon	Formula
	C_6H_8
Hexane	C_6H_{10}
	C_6H_{12}
Hexene	C_6H_{14}
	C_6H_{16}

1 0 . 2

Bromine water is added to hexane and to hexene.

What would be observed when bromine water is added to hexane and to hexene?

[2 marks]

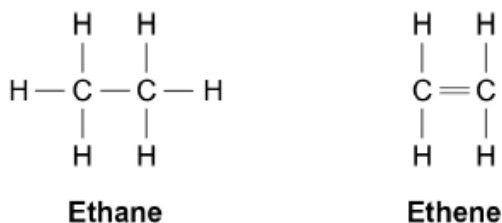
Hexane orange-brown colour remains

Hexene orange-brown colour is decolourised

1 0 . 3 Ethane is an alkane and ethene is an alkene.

Figure 8 shows the displayed structural formulae of ethane and of ethene.

Figure 8



Compare ethane with ethene.

You should refer to:

- their structure and bonding
- their reactions.

Ethane is saturated and only has single bonds. Ethene is unsaturated and contains a double bond. Ethene has a planar structure. [6 marks]

Ethane can react with halogens through free radical substitution in the presence of UV light.

Ethene can undergo hydrogenation to form ethane when a catalyst is present. It can also react with steam to form alcohol in hydration. It reacts with bromine water and decolourises the orange-brown colour. Molecules of ethene can form polyethene through polymerisation.