2021 ASSESSMENT MATERIALS

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]

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]

Pollutant	**Polluting effect**
	Acid rain
Particulates	Global dimming
	Global warming
Sulfur dioxide	Landfill
	Sewage sludge

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

[2 marks]

Tick **two** boxes.

- Ammonia ☐
- Carbon dioxide ☐
- Carbon monoxide ☐
- Nitrogen ☐
- Oxygen ☐

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 ☐
- Build new car factories ☐
- Develop fuel efficient engines ☐
- Make car tax cheaper ☐
- Use electric cars ☐

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 _____.

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

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?

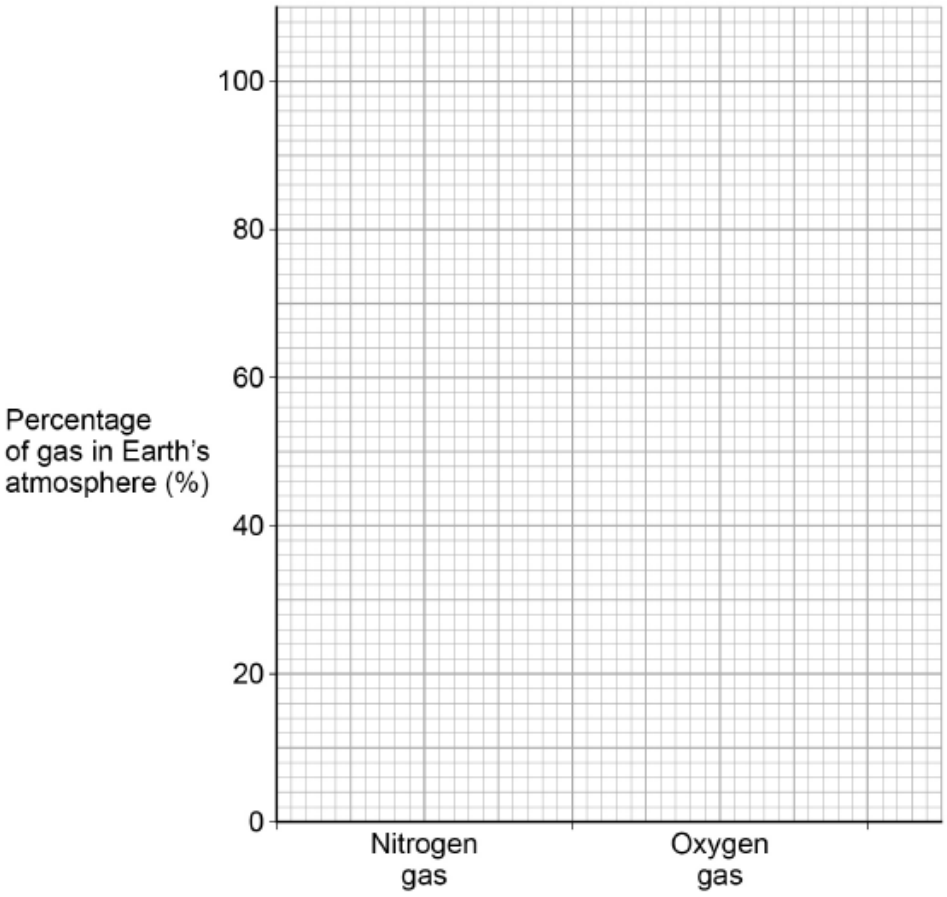
[1 mark]

_____ and _____

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]

Figure 2



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. ☐

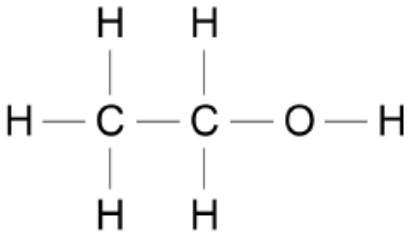
Short wavelength radiation is reflected back to the surface of Titan. ☐

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 _____.

0 7 . 5 What is added to grape juice to cause fermentation?

[1 mark]

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:

$$2\,CH_3COOH(aq) + Na_2CO_3(s) \rightarrow 2\,CH_3COONa(aq) + H_2O(l) + CO_2(g)$$

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

[1 mark]

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

400 cm^3 of vinegar contains 20 g of ethanoic acid.

Calculate the mass of ethanoic acid in 1.0 dm^3 of vinegar.

[3 marks]

Mass = _____ 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 _____

_____

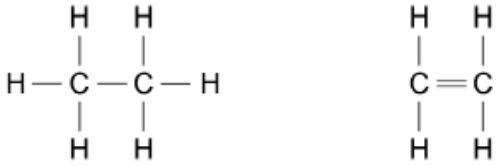
Hexene _____

_____

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



Ethane **Ethene**

Compare ethane with ethene.

You should refer to:

- their structure and bonding
- their reactions.

[6 marks]