

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C9 - TEST 2

CHEMISTRY OF THE ATMOSPHERE

Beginner

Mark schemes

- 1.** (a) (i) water vapour given out from volcano
accept steam
not hydrogen and oxygen combining to form water 1
- condensed
accept rain / clouds formed just 'cools' is insufficient 1
- (b) nitrogen (left) N₂
do not accept N 1
- oxygen (right) O₂
do not accept O 1
- [4]**
- 2.** (a) any **two** from:
• Earth's atmosphere more / mostly nitrogen
allow converse
• Earth has more oxygen
allow Venus has no oxygen
• Earth has (much) less carbon dioxide
allow converse 2
- (b) (carbon dioxide) respiration / combustion / volcanic eruptions / decomposition / animals
allow (carbon dioxide) breathed out 1
- (oxygen) plants / algae / producers / photosynthesis 1
- (c) evaporation / transpiration
allow (enters atmosphere through) exhalation 1
- precipitation / rain / snow / sleet / condensation / freezing 1
- (d) global warming 1

- (e) any **two** from:
- sea-level rise **or** high tides travel further inland
 - melting ice caps
 - flooding
 - less land for farming
 - changes to which plants will grow (due to climate change)
 - (increased) coastal erosion
 - extreme weather
 - change in rainfall
 - drought
 - desertification
 - loss of habitat
 - temperature stress (for humans and wildlife)
 - decreased food-producing capacity of some regions

ignore global warming

ignore temperature change unqualified

2

[9]

3.

- (a) sulfur dioxide / SO₂

allow sulfur oxide

1

- (b) global dimming

1

- (c) oxygen / O₂

1

- (d) (oil is a) limited resource / finite / non-renewable

*accept running out of oil **or** wood is sustainable*

*accept (burning oil) increases amount of carbon dioxide in the atmosphere / global warming **or** releases locked up carbon / global dimming / acid rain*

accept the oil (may become) too expensive

1

- (e) carbon dioxide produced (from burning wood)

ignore global warming

1

carbon dioxide used by plants / trees **or** for photosynthesis

if no other mark awarded

*allow carbon emissions used by plants / trees **or** for photosynthesis for 1 mark*

1

[6]

4.

- (a) 16

1

(b) 8 e⁻ in 2nd shell
6 e⁻ in 3rd shell
allow •, x, e⁻ or any combination 1

(c) oxygen → sulfur dioxide
allow = in place of →
*do **not** accept sulfur oxide*
ignore symbols 1

(d) acid rain 1

(e) yes / no
any **two** from:
• increases
allow goes up
• constant
allow similar
• decreases
allow goes down
allow levels off (at the end) 2

correct date range for any one of the above
• (increases) 1984–1987
• (constant) 1987–1990
• (decreases) 1990–2014 1

(f) (69 + 6 =) 75 1
100 - 75 = 25(%)
allow a final percentage calculated from an incorrect value in the first step 1
an answer of 25(%) scores 2 marks

[9]

5. (a) 0.1% 1

(b) bar correctly drawn to ±½ square 1

(c) argon 1

- (d) increased 1
- data values to justify 1
- (e) electricity and industry are equal 1
- electricity and industry are highest 1
- transport is lowest 1
- electricity or industry is double transport 1
- (f) use of renewable energy sources
or
specific example 1
- (g) limited investment in renewable technology
or
disagreement between countries 1
- accept specific reason which relates to response to (f), eg
insufficient sunlight* 1
- [11]**

- 6.** (a) (i) sulfur dioxide / SO₂ 1
- (ii) global dimming 1
- (iii) carbon dioxide / CO₂
ignore ozone 1
- increases the levels (of carbon dioxide)
*accept it is a greenhouse gas or causes global warming /
greenhouse effect* 1
- (b) gas / oil bar correct length 1
- coal bar correct length 1
- [6]**

- 7.** (a) hydrocarbon is a compound
not mixture not substance 1

containing carbon and hydrogen

accept of the elements carbon and hydrogen

accept of carbon and hydrogen

contains hydrogen and carbon only (2)

1

(b) (i) any order

carbon dioxide

accept CO₂

exact formulae

2

water 1

accept H₂O

not carbon in one box and dioxide in second box (0)

ignore any attempt to 'balance' the equation

(ii) it is poisonous

accept toxic

can kill you

accept any reasonable description

*of its effect on red blood cells **or** on*

haemoglobin in terms of reducing

oxygen transport

not can explode, harmful,

dangerous, flammable

1

[5]

8.

(a) argon / Ar

1

(b) (i) 0

1

(ii) unreactive

1

(c) (i) 94.96(%)

1

(ii) any **two** from:

- plants or photosynthesis

- absorbed in oceans / seas

*allow oceans store **or** take in **or** dissolve carbon dioxide*

- locked up in (sedimentary) rocks

- locked up in fossil fuels

2

[6]

9.	(a) acid rain → sulfur dioxide	1
	global warming → carbon dioxide	1
	global dimming → carbon particles	1
	(b) (i) oxygen	1
	(ii) carbon monoxide	1
	(c) (i) decreasing <i>accept running out / none left</i>	1
	(ii) any two from: <i>it = coal</i>	
	• world needs (more) energy <i>accept population is increasing</i> <i>allow (greater) demand for coal / fuels / energy</i>	
	• plentiful supply <i>accept readily available</i> <i>allow coal will 'last longer'</i>	
	• (many) countries have coal	
	• easy to find / extract	
	• oil / gas is running out <i>accept need to use less oil / gas</i> <i>accept need to use it to replace oil / gas</i>	
	• cheap or cheaper than oil	2
		[8]
10.	(a) CO ₂	1
	(b) carbon dioxide <i>ignore formulae</i> <i>ignore carbon oxide</i> <i>do not accept carbon monoxide</i>	1
	(c) 46.2 (kg) <i>allow 46 (kg)</i>	1

- (d) (fossil / hydrocarbon) fuels burn / combust
allow named fossil fuels 1
- in a limited supply of oxygen / air
allow lack of oxygen / air 1
- an answer of incomplete combustion gains 2 marks*
- (e) red blood cells 1
- (f) cell death 1
- decreased respiration rate 1
- (g) any **one** from:
ignore breathing problems
- damages buildings / bridges / statues
allow damages iron / metal / limestone structures
 - harms / kills plants / trees
 - harms living organisms in ponds / rivers / lakes
allow harms aquatic organisms

1

[9]