

MARK SCHEME

GCSE

CHEMISTRY

AQA - COMBINED SCIENCE

C9 - TEST 5

CHEMISTRY OF THE ATMOSPHERE

Advanced

Mark schemes

- 1.** (a) 4.6×10^9 years 1
- (b) $\frac{780\,000 - 27\,000}{27\,000} \times 100$ 1
- = 2788.8 1
- = 2800 (%) 1
- allow an answer from an incorrect calculation correctly given to 2 significant figures* 1
- an answer of 2800 (%) scores 3 marks*
- allow 2788.88889 (%) or correctly rounded answer for 2 marks*
- (c) incomplete combustion 1
- (d) volcanoes (on early Earth) released water vapour 1
- (water vapour then) condensed (to form the oceans) 1
- allow steam for water vapour*
- (e) ice caps have melted 1
- [8]**
- 2.** (i) solid particles 1
- accept soot / carbon / unburnt fuels*
- (ii) global dimming 1
- allow smog*
- (iii) any **two** from:
- irregular pattern in the graph
 - cannot predict future development of industry / technology
 - cannot predict future number of cars
 - cannot predict future efficiency / type of engines
 - might be other sources of particulates in future
 - change in amount of fossil fuels burnt
 - cannot predict future volcanic eruptions
- allow change in use to other fuels / energy sources* 2

[4]

3.

(a) any **two** 1 mark each

burning / combustion

fossil fuels **or** (locked up) carbon

accept fuel / named fuel

oxygen used

2

(b) any **three** from

produces (calcium) carbonate

which is insoluble

produces (calcium) hydrogencarbonate

which is soluble

photosynthesis

releases oxygen

3

[5]

4.

Level 3 (5–6 marks):

A full explanation is given that is coherent and logically structured, linking effect of increase in carbon dioxide to climate change and effects on biodiversity.

Level 2 (3–4 marks):

An attempt is made to link the effects of rising carbon dioxide levels to climate change and biodiversity. The logic may be inconsistent at times but builds towards a coherent explanation.

Level 1 (1–2 marks):

Discrete relevant points made. The logic may be unclear and attempts at reasoning may not be consistent.

0 marks:

No relevant content.

Indicative content

- rise in carbon dioxide increases atmospheric temperature / causes global warming
- global warming causes extreme weather patterns
- such as rise in sea levels
- increased or decreased rainfall
- frequency of storms / droughts
- rise in sea levels means habitats will change due to flooding
- rise in sea levels could increase salt in soil
- increased rainfall will increase water levels
- severity of storms / droughts could affect photosynthesis
- consequences of changes are loss of or damage to habitats
- which will affect animal and plant distributions
- by increasing migration or species dying off
- which decreases biodiversity

[6]

5.

(a) 95% (1 mark for working)

2

(b) Much less carbon dioxide
Much more nitrogen

2

(c) Plants take up CO₂
plants give out oxygen
when they die trap CO₂ in rocks and fossil fuels
methane and ammonia reacted with oxygen
nitrogen gas produced
by reaction of oxygen and ammonia
and by denitrifying bacteria
formation of ozone layer

any 4 for 1 mark each

4

[8]

6.

(i) 12

1

(ii) (oxygen) produced by algae / plants

1

during photosynthesis

1

[3]

7.

(a) any **two** environmental problems with linked explanations

- global warming (1)

accept effects of global warming

caused by (formation of) carbon dioxide / greenhouse gas (1)

ignore greenhouse effect

- acid rain (1)

accept effects of acid rain

ignore respiratory problems

caused by (formation of) sulfur dioxide (1)

accept sulfur oxide

ignore sulfuric acid

- global dimming (1)

ignore respiratory problems

caused by (formation of) particles / particulates / fires /
smoke / carbon / pm 10 (1)

- scarring of landscape (1)

caused by mining / quarrying of coal (1)

ignore ozone layer

max 4

(b) any **three** from:

- replant the trees / renewable / sustainable
ignore reusable
- carbon dioxide is used by the trees / photosynthesis
accept trees absorb carbon dioxide as they grow
*do **not** allow respiration*
- it's a (continuous carbon) cycle
accept 'carbon dioxide goes back into the air'
accept trees use CO₂ which is released when trees are burnt
- no 'new' carbon (dioxide) is produced **or**
no locked up carbon (dioxide) is released
accept no carbon (dioxide) from fossil fuels is produced

3

[7]

8.

(a) ammonia

accept NH₃

1

(b) (i) because the gases are unreactive

accept because the measuring equipment was not very precise

1

(ii) by fractional distillation

1

(iii) argon has a density greater than the density of nitrogen

1

[4]