

# MARK SCHEME

# GCSE

## CHEMISTRY

## AQA - TRIPLE SCIENCE

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C9 - TEST 4  
ATMOSPHERE  
Intermediate

## Mark schemes

- 1.** (a) combustion  
*for one mark* 1
- (b) B  
*for one mark* 1
- [2]
- 2.** (a) **either** any **two** points (1) each from
- \* (surface) below 100 °C (the surface) below the boiling point of water
  - \* (allowed the) condensation (of water vapour)  
*accept (rate of) condensation greater than (the rate of) evaporation*
  - \* from the atmosphere  
*accept from the air*
- or** condensed water (vapour) (1)  
was pulled by gravity into depressions (1)  
*or idea of impervious sea bed*
- or** from comets (which crashed on the Earth) (1)  
ice (from these) melted (1) 2
- (b) any **two** processes (1) each from
- \* dissolving in (sea) water
  - \* (taken in during) photosynthesis  
*accept taken in by algae **or** plants*
  - formation of carbonate(s)  
**or** calcium carbonate **or** chalk **or** calcite  
*accept formation of shells **or** bones **or** corals* 2
- [4]
- 3.** (a) any **one** from:
- not enough evidence or proof  
*allow no evidence or no proof*
  - (life and the Earth were created) billions of years ago  
*allow a long time ago*  
*ignore different beliefs or no one was there.* 1

- (b) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the Marking Guidance and apply a ‘best-fit’ approach to the marking.

**0 marks**

No relevant content

**Level 1 (1–2 marks)**

Statements based on diagrams

**Level 2 (3–4 marks)**

Description of how one change occurred

**Level 3 (5–6 marks)**

Descriptions of how at least two changes occurred

**Examples of chemistry points made in the response could include:**

**Main changes**

- oxygen increased because plants / algae developed and used carbon dioxide for photosynthesis / growth producing oxygen; carbon dioxide decreased because of this
- carbon dioxide decreased because oceans formed and dissolved / absorbed carbon dioxide; carbon dioxide became locked up in sedimentary / carbonate rocks and / or fossil fuels
- oceans formed because the Earth / water vapour cooled and water vapour in the atmosphere condensed
- continents formed because the Earth cooled forming a supercontinent / Pangaea which formed the separate continents
- volcanoes reduced because the Earth cooled forming a crust.

**Other changes**

- nitrogen has formed because ammonia in the Earth’s early atmosphere reacted with oxygen / denitrifying bacteria.

6

[7]

4.

- (a) (i)  $C_7H_{16}$

*mark answer line first*

*answer may be given in the table*

1

- (ii)  $C_nH_{2n+2}$

1

- (b) (i) carbon monoxide

*do **not** accept carbon oxide*

*do **not** accept water*

*ignore CO*

1

- (ii) because of partial / incomplete combustion (in reaction 2) **or** complete combustion (in reaction 1)  
*allow because there is less / insufficient oxygen (in reaction 2) **or** sufficient oxygen (in reaction 1) allow different amounts of oxygen used (in the reactions) **or** 19O<sub>2</sub> (in reaction 1) **and** 13O<sub>2</sub> (in reaction 2)*  
*ignore air* 1
- (c) (i) 15 (%)  
*ignore units* 1
- (ii) water (vapour)/steam  
*allow H<sub>2</sub>O / OH<sub>2</sub> / hydrogen oxide* 1
- (iii) sulfur in petrol / crude oil (reacts with oxygen)  
*it = sulfur dioxide* 1
- (ii) because nitrogen **and** oxygen (are in the air and) react  
*allow nitrogen **and** oxygen burn*  
*accept nitrogen + oxygen → nitrogen oxide **or** symbol equation*  
*ignore air* 1
- at high temperature (inside a petrol engine)  
*allow heat / hot (engine)* 1
- (d) because carbon dioxide / it causes global warming **or**  
*allow because carbon dioxide / it causes greenhouse effect / climate change* 1
- because carbon dioxide / it has an impact on oceans
- because this carbon dioxide / carbon / it was 'locked up' (in fossil fuels) **or**
- because the percentage/amount of carbon dioxide / it in the atmosphere is increasing 1

[11]

5.

- (a) (i) H<sub>2</sub>O  
*must be formula* 1
- CaO  
*must be formula* 1

(ii) carbon dioxide from the air / (Earth's early) atmosphere

*it = carbon (dioxide)*

*accept carbon dioxide from millions of years ago*

1

formed (sedimentary) rocks **or** fossil fuels

*ignore trapped / stored*

1

(b) (i) decreases rapidly at first

*it = carbon (dioxide)*

1

then slowly **or** levels off

*allow both marks if the description is correct using either 'rapidly' **or** 'slowly'*

*allow correct use of figures for either marking point*

*if no other mark awarded, allow CO<sub>2</sub> decreased for 1 mark*

1

(ii) any **two** from:

*it = carbon (dioxide)*

*accept photosynthesis*

- used by plants
- dissolved in oceans
- 'locked up' in fossil fuels **or** formed fossil fuels
- 'locked up' in rocks **or** formed rocks

2

(c) (yes)

*it = percentage of carbon (dioxide)*

*ignore yes or no*

because the percentage of carbon dioxide is increasing

1

which causes global warming (to increase)

*allow (carbon dioxide) causes greenhouse effect/climate change*

1

or

(no)

because the percentage of carbon dioxide is low (1)

compared to millions of years ago (1)

*allow global warming can be caused by other factors (e.g. Sun / water vapour / methane)*

[10]

6.

(a) (i) core

1

(ii) plate (boundaries)

*accept parts of the crust*

*ignore crust alone*

1

sudden movement / colliding

*accept movement but ignore movement apart*

or

normally move a few centimetres per year

*accept continental drift*

1

convection currents / driven by heat from radioactive processes / decay

*idea of source of energy for the movement*

1

the idea of uncertainty with an explanation

eg scientists do not know (with any certainty)

- what happens under the crust
- where the forces / pressure are building up
- we cannot measure the forces
- when the forces reach their limit

*ignore references to volcanoes*

1

(b) (i) 78

(ii) marks awarded for any 2 gases from the following 3 gases  
*max 3 marks from CO<sub>2</sub>*

1

any **four** from:

*ignore references to respiration*

carbon dioxide has decreased:

- used by plants / bacteria (stromatolites)
- during photosynthesis (must be linked to CO<sub>2</sub> decrease)
- 'locked up' in (sedimentary) rocks / carbonates / fossil fuels
- dissolved in oceans

**and / or**

oxygen has increased because:

- released by plants / bacteria (stromatolites)
- during photosynthesis (must be linked to O<sub>2</sub> increase)

**and / or**

nitrogen has increased because

- ammonia reacted with oxygen (to release nitrogen)
- nitrogen is released by bacteria

4

[10]