AQA GCSE Chemistry

Chemistry of the atmosphere mark scheme · goes with “Chemistry of the atmosphere · Higher tier” · whiteboardchemistry.com/revision/gcse-chemistry/exam-questions

Mark schemes

Chemistry of the atmosphere · Higher tier · 5 questions

Q1 · June 2022 · Paper 2 Higher · Q6 · [10 marks]

06.1

(the percentage of) nitrogen increased

(because of intense) volcanic activity

[2 marks]

06.2

(the percentage of) carbon dioxide decreased

(because) carbon dioxide dissolved in oceans

or

(because of) formation of carbonate (precipitates / sediments)

do not accept references to photosynthesis

[2 marks]

06.3

(the percentage of) carbon dioxide decreased

and

(the percentage of) oxygen increased

the increase and decrease (in percentage) occur at the same / similar rate

allow the changes (in percentage) are the same / similar in the same period of time

[2 marks]

06.4

photosynthesis

allow a description of photosynthesis

[1 mark]

06.5

plankton (died)

allow tiny marine organisms (died)

and (the organisms) were covered by sediments

allow and (the organisms) were buried

allow and (the organisms) were in anaerobic conditions

and subjected to high temperature

and

high pressure

(over millions of years)

[3 marks]

Q2 · June 2023 · Paper 2 Higher · Q4 · [8 marks]

04.1

water vapour

[1 mark]

04.2

(increased population so) more energy required

allow (increased population so) more transport required

(so) more (fossil) fuels burned

allow a named fossil fuel

OR

(increased population so) more farmland required (1)

(so) more deforestation (1)

[2 marks]

04.3

(increased population so) more food required

(so) more methane-producing food production

allow more use of beef cattle (in food production)

allow more rice grown

OR

(increased population so) more waste produced (1)

(which) produces more methane on decomposition (1)

[2 marks]

04.4

any **two** from:

- melting ice
- rising sea levels
- flooding
- extremes of weather
- loss of habitats

ignore global warming

do not accept acid rain

do not accept global dimming

do not accept references to ozone

[2 marks]

04.5

there may be other reasons for changes in the (mean) temperature (of the atmosphere at the Earth's surface)

allow difficult to model

allow the earth goes through cycles of temperature change

[1 mark]

Q3 · June 2024 · Paper 2 Higher · Q5 · [12 marks]

05.1

high temperatures

ignore pressure

(cause) nitrogen (from air) and oxygen (from air) to react

[2 marks]

05.2

ignore references to water vapour

less climate change

allow less global warming

allow an effect of climate change for climate change

(because) no carbon dioxide (produced)

[2 marks]

05.3

more oxides of nitrogen (produced)

(so) more acid rain

or

(so) more respiratory problems

allow an effect of acid rain for acid rain

allow a named respiratory problem for respiratory problems

MP2 cannot be linked to an incorrect gas from MP1

[2 marks]

05.4

(volume of oxygen = 3.50 × ½ =)

1.75 (dm^3)

(volume of air =) $1.75 \times \frac{100}{20}$

allow correct use of an incorrectly determined volume of oxygen

= 8.75 (dm^3)

[3 marks]

05.5

there is a temperature gradient in the (fractionating) column

allow the (fractionating) column gets cooler going up

(so) kerosene condenses

allow (so) the hydrocarbons / vapours condense

at the level (in the column) corresponding to kerosene's boiling point (range)

allow at the level (in the column) corresponding to the boiling point of the hydrocarbons / vapours

for the award of 2 marks for

MP2 and MP3, a reference to kerosene must be made

[3 marks]

Q4 · June 2025 · Paper 2 Higher · Q4 · [9 marks]

04.1

(the percentage of) nitrogen increased

(because of intense) volcanic activity

[2 marks]

04.2

(carbon dioxide) dissolved in water / oceans

(carbonate) forming sediments / precipitates

do not accept formed shells of sea creatures

do not accept photosynthesis

do not accept formed fossil fuels

[2 marks]

04.3

all four points plotted correctly

allow a tolerance of ± ½ a small square

line of best fit

[2 marks]

04.4

ignore dissolving in oceans

ignore sedimentation

carbon dioxide decreased

and

oxygen increased

(because of) photosynthesis

do not accept respiration

(by) algae / plants

allow (by) cyanobacteria

[3 marks]

Q5 · November 2021 · Paper 2 Foundation · Q8 · Paper 2 Higher · Q1 · [12 marks]

08.1

use of oil has decreased by 0.8%

or

use of oil has decreased from 1.3% to 0.5%

use of solar energy has increased by 3.4%

or

use of solar energy has increased from 0% to 3.4%

allow any value below 0.05% for 2007

any **one** from:

- use of oil increased from 2007

to 2009

- no change in oil use between 2013 and 2015
- no change in solar energy use between 2007 and 2009
- use of solar energy increased most between 2013 and 2015
- between 2007 and 2011 more oil was used **and** between 2013 and 2017 more solar energy was used

allow use of oil was highest in 2009

if no other mark is awarded,

*allow **1** mark for oil decreased **and** solar energy increased*

[3 marks]

08.2

Level 3 (5–6 marks): Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

Level 2 (3–4 marks): Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

Level 1 (1–2 marks): Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

No relevant content (0 marks)

Indicative content

- carbon dioxide produced
- (which is) a greenhouse gas
- (therefore) surface temperature increases
- (therefore) global warming
- (so) climate change
- (so) polar ice caps melt
- (so) increasing sea levels
- (so) flooding
- (so) extreme weather events
- (so) reduction in biodiversity
- (so) famine / drought
- sulfur dioxide produced
- (which causes) acid rain
- (so) damage to buildings / statues
- (so) damage to trees
- (so) damage to aquatic animals
- (so) respiratory problems in humans
- carbon / soot produced
- (which are) particulates
- (which cause) global dimming
- (so) respiratory problems in humans
- carbon monoxide produced
- (which is) toxic

[6 marks]

08.3

solar is (a) renewable (source of energy)

allow oil is (a) finite (source of energy)

[1 mark]

08.4

any **two** from:

- sunshine is unreliable
- increased demand for energy
- lack of space

ignore references to cost

[2 marks]

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