AQA GCSE Chemistry

Quantitative chemistry mark scheme · goes with “Quantitative chemistry · Foundation tier” · whiteboardchemistry.com/revision/gcse-chemistry/exam-questions

Mark schemes

Quantitative chemistry · Foundation tier · 4 questions

Q1 · June 2023 · Paper 1 Foundation · Q8 · [10 marks]

08.1

$Fe_2O_3 + 3C \rightarrow$ **2**Fe + **3**CO

allow multiples

*allow **1** mark for 2 Fe*

or

*allow **1** mark for 3 CO*

[2 marks]

08.2

(iron oxide) loses oxygen

ignore references to gain of electrons

[1 mark]

08.3

(M_r =)

(2 × 56) + (3 × 16)

allow 112 + 48

= 160

[2 marks]

08.4

(percentage atom economy =)

$$\frac{63.5}{2 + 79.5} \times 100$$

= 77.9 (%)

allow 77.914110 (%) correctly rounded to at least 2 significant figures

[2 marks]

08.5

any **one** from:

- colour change (in solution)
- colour change (in metal)

- change of temperature

allow bubbles

[1 mark]

08.6

(most reactive) D

B

A

(least reactive) C

(reason) more reactive (metals) displace less reactive (metals)

*allow D has most (displacement) reactions **and** C does not react*

allow the more reactive metals have more (displacement) reactions

[2 marks]

Q2 · June 2025 · Paper 1 Foundation · Q10 · Paper 1 Higher · Q3 · [11 marks]

10.1

(substance reduced)

SnO_2

allow tin oxide

(reason)

(SnO_2) loses oxygen

allow (tin oxide) loses oxygen

MP2 is dependent upon MP1 being awarded

[2 marks]

10.2

carbon is more reactive than tin

allow tin is less reactive than carbon

[1 mark]

10.3

(total M_r = 128 + 12 =) 140

allow (total M_r = 112 + 12 + 16

=) 140

(% atom economy =)

(112)/(140) ×100

allow correct use of an incorrectly determined total M_r

= 80 (%)

[3 marks]

10.4

allow the converse for potassium

allow the transition metal for tungsten

allow the Group 1 metal for potassium

ignore references to atomic structure

any **two** from:

tungsten

- has a higher melting / boiling point
- is denser
- is harder

allow is less malleable / ductile

- is stronger
- is less reactive

allow specific reactions showing difference in reactivity

- has ions with different charges
- forms coloured compounds
- can be a catalyst

[2 marks]

10.5

(sum of relative formula masses on left hand side =)

232 + (3 × 2) = 238

allow (sum of relative formula masses on left hand side =)

232 + 6 = 238

(is equal to sum of relative formula masses on right hand side =)

184 + (3 × 18) = 238

allow (is equal to sum of relative formula masses on right hand side =)

184 + 54 = 238

if no other mark awarded,

*allow **1** mark for 232 + 6 = 184 + 54*

or

*allow **1** mark for both sides = 238*

[2 marks]

10.6

for sustainable development

allow to minimise use of limited resources

allow to minimise use of energy

allow to minimise waste

or

for economic reasons

ignore references to yield

[1 mark]

Q3 · November 2021 · Paper 1 Foundation · Q10 · Paper 1 Higher · Q3 · [10 marks]

10.1

(3 × M_r H_2O = 3 × (2 + 16) =) 54

(A_r R = 150 – 54 =) 96

ignore units

alternative approach:

(M_r RO_3 = 150 – 6 =) 144 (1)

(A_r R = 144 – (3 × 16) =) 96 (1)

ignore units

[2 marks]

10.2

(R =) molybdenum / Mo

allow ecf from question 10.1

[1 mark]

10.3

(total M_r of reactants) = 163

(% atom economy =) (119)/(163) (×100)

allow correct use of an incorrectly calculated value of total M_r

= 73 (%)

allow 73.00613 (%) correctly rounded to at least 2 significant figures

[3 marks]

10.4

Level 2 (3–4 marks): Some logically linked reasons are given. There may also be a simple judgement.

Level 1 (1–2 marks): Relevant points are made. They are not logically linked.

No relevant content (0 marks)

Indicative content

- carbon and iron are the cheapest reactants

- hydrogen is the most expensive reactant
- separating solid products is expensive
- separating solid products is time consuming
- in method 1, tungsten needs to be separated from tungsten carbide
- in method 1, some tungsten is lost as tungsten carbide
- in method 1, the carbon dioxide produced will escape
- in method 2, the water vapour produced will escape
- in method 2, no separation of solids is needed
- in method 3, tungsten needs to be separated from iron oxide

[4 marks]

Q4 · November 2021 · Paper 2 Foundation · Q6 · [8 marks]

06.1

flame emission spectroscopy

flame test

[2 marks]

06.2

white

[1 mark]

06.3

barium chloride (solution)

[1 mark]

06.4

(conversion)

(800 cm^3 = (800)/(1000) =) 0.8

(dm^3)

allow correct use of incorrect / no volume conversion

(mass =) 0.8 × 258 (g)

= 206.4 (g)

= 206 (g)

allow an answer correctly calculated to 3 significant figures from an incorrect calculation which uses the values in the question

alternative approach:

(conversion)

(258 g/dm^3 = (258)/(1000) =) 0.258

(g/cm^3) (1)

(mass =) 0.258 × 800 (g) (1)

allow correct use of incorrect / no concentration conversion

= 206.4 (g) (1)

= 206 (g) (1)

allow an answer correctly calculated to 3 significant figures from an incorrect calculation which uses the values in the question

[4 marks]

Source: AQA GCSE Chemistry past papers. Reproduced for revision at whiteboardchemistry.com.