

Simple Model; Symbols; RAM; Charge; Isot

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.1 Atomic Structure and the Periodic Table
Sub-Topic	Simple Model; Symbols; RAM; Charge; Isot
Difficulty Level	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 60 minutes

Score: /59

Percentage: /100

Grade Boundaries:

M1.(a)	A base	1
	(b) forces	1
	(c) calcium loses electrons and oxygen gains electrons <i>max 3 for incorrect reference to atom / ion or to oxygen / oxide</i>	1
	two electrons are transferred	1
	calcium has a 2^+ charge	1
	oxide has a 2^- charge	1
		[6]
M2.(a)	mobile phase propanone	1
	stationary phase paper	1
	(b) any three from:	

- contains chlorophyll a, b and carotene
- contains Pigment B
- does not contain pheophytin
- contains (at least) one unknown substance
- contains five substances
- contains a substance that does not dissolve in the solvent

3

(c) $R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$

1

- (d) both measurements correct

solvent front = 9.0 cm and pigment B distance = 5.0 cm

1

$$R_f = 5.0 / 9.0$$

1

$$= 0.56$$

allow ecf from incorrect measurements

1

- (e) origin line drawn in ink

1

so it will run **or** dissolve in the solvent **or** split up

1

spots under solvent **or** solvent above spots / origin line

1

so they will mix with solvent **or** wash off paper **or** colour the solvent **or** dissolve in the solvent

1

M3.(a) (i) neutrons

this order only

1

electrons

1

protons

1

(ii) box on the left ticked

1

(b) (i) effervescence / bubbling / fizzing / bubbles of gas

*do **not** accept just gas alone*

1

magnesium gets smaller / disappears

allow magnesium dissolves

*allow gets hotter **or** steam produced*

*ignore references to magnesium moving and floating /
sinking and incorrectly named gases.*

1

(ii) Marks awarded for this answer will be determined by the Quality of Communication (QC) 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)

There are simple statements of some of the steps in a procedure for obtaining magnesium chloride.

Level 2 (3–4 marks)

There is a description of a laboratory procedure for obtaining magnesium chloride from dilute hydrochloric acid and magnesium.

The answer must include a way of ensuring the hydrochloric acid is fully reacted **or** a method of obtaining magnesium chloride crystals.

Level 3 (5–6 marks)

There is a well organised description of a laboratory procedure for obtaining magnesium chloride that can be followed by another person.

The answer must include a way of ensuring the hydrochloric acid is fully reacted **and** a method of obtaining magnesium chloride crystals.

examples of the points made in the response:

- hydrochloric acid in beaker (or similar)
- add small pieces of magnesium ribbon
- until magnesium is in excess or until no more effervescence occurs *
- filter using filter paper and funnel
- filter excess magnesium
- pour solution into evaporating basin / dish
- heat using Bunsen burner
- leave to crystallise / leave for water to evaporate / boil off water
- decant solution
- pat dry (using filter paper).

*Student may choose to use a named indicator until it turns a neutral colour, record the number of pieces of magnesium added then repeat without the indicator.

6

[12]

M4.(a) (i) protons

allow "protons or electrons", but do not allow "protons and electrons"

1

(ii) protons plus / and neutrons

1

(b) (because the relative electrical charges are) $-(1)$ for an electron and $+(1)$ for a proton

allow electrons are negative and protons are positive

1

and the number of electrons is equal to the number of protons

if no other mark awarded, allow 1 mark for the charges cancel out

1

(c) (the electronic structure of) fluorine is 2,7 and chlorine is 2,8,7

allow diagrams for the first marking point

1

(so fluorine and chlorine are in the same group) because they have the same number of or 7 electrons in their highest energy level or outer shell

if no other mark awarded, allow 1 mark for have the same / similar properties

1

(d) S

1

(e) (i) ions

1

(ii) molecules

1

[9]

M5.(a) because this lithium atom has

3 protons

1

and 4 neutrons

1

mass number is total of neutrons and protons

accept protons and neutrons have a mass of 1

accept number of neutrons = 7 - 3(protons)

ignore mass of electron is negligible

1

(b) grams

accept g

1

^{12}C

allow carbon-12 or C-12

ignore hydrogen or H

1

(c) any **three** from:

*max 2 if no numbers given
numbers if given must be correct*

- both have 8 protons
accept same number of protons
- ^{18}O has 10 neutrons
- ^{16}O has 8 neutrons
accept different number of neutrons or ^{18}O has two more neutrons for 1 mark
- both have 8 electrons.
accept same number of electrons

3

[8]

M6.(a) (i) Na

*allow sodium / phonetic spelling
if more than one answer is given apply list principle*

1

(ii) Fe

*allow iron / phonetic spelling
if more than one answer is given apply list principle*

1

(iii) Na or S

*allow sodium or sulfur / sulphur / phonetic spelling
if more than one answer is given apply list principle*

1

(iv) S

*allow sulfur / sulphur / phonetic spelling
if more than one answer is given apply list principle*

1

(v) Na

allow sodium / phonetic spelling

if more than one answer is given apply list principle

1

(b) (i) any **three** from:

- effervescence / fizzing **or** bubbles **or** gas produced
do not allow incorrectly named gas
- sodium melts **or** turns into a ball
- sodium moves (on the surface)
- steam / mist / vapour is produced
ignore heat / temperature / flame / spark
- sodium gets smaller / disappears
allow dissolves
- colour of indicator is darker / more intense near the sodium
Must be linked to near the sodium.

3

(ii) hydroxide **or** OH^-

allow OH without a charge

do not allow OH^+

1

(c)

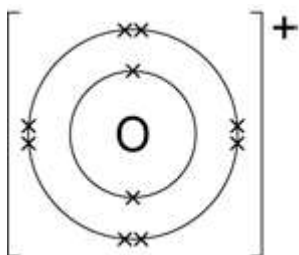


diagram showing electron configuration of ion is 2,8

1

charge on ion is +

Bracket not necessary

$[2,8]^+$ is worth 1 mark as there is no diagram

1

[11]