Name of the Student:_____
Max. Marks : 27 Marks **Time : 27 Minutes**

Mark Schemes

Q1.

(a) (i) Blue to green

Accept blue to yellow.

1

(ii) Decrease / less acid needed

Ignore references to rate

1

(iii) Gloves **or** avoid skin contact

Allow 'if reagent contacts skin wash off (immediately)' or answers to that effect.

Do not accept 'wash' only.

Ignore 'eye protection' or 'lab coat' or 'use of fume cupboard' or 'don't ingest'.

1

(iv) Less chance of losing liquid on swirling / liquid doesn't splash on swirling

Do not accept 'easier to swirl' on its own.

Do not accept 'easier to stir'.

1

(v) Idea that a single titration could be flawed / anomalous

Allow an indication that the first titration is a rough titration.

Do not allow 'to improve accuracy' without qualification.

Do not allow vague references to 'outliers'.

1

(b) (i) $2.3(3) \times 10^{-2}$

Do not penalise additional significant figures, but do not allow 0.02

1

(ii) Dilution of acid needed / may react with carbon dioxide in air

Accept 'poor end-point' or 'no suitable indicator' or 'a large volume (of calcium hydroxide) will be needed'.

Ignore references to low solubility or concentration too low.

1

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Q2.

(a) Remove undissolved barium hydroxide / <u>excess</u> solid

Do not accept 'remove impurities'.

1

(b) Filtration

Do not accept 'decanting' or 'sieving'.
Ignore references to heating or drying.

1

(c) Remove (excess) sulfuric acid

1

(d) $Ba(OH)_2 + H_2SO_4 \rightarrow BaSO_4 + 2H_2O$

Accept multiples.
Accept $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$
Ignore state symbols.

1

(e) (i) 233.4

Accept 233

1

(ii) 0.018(2)

Do not penalise additional significant figures, but do not allow 0.02
Allow consequential answer from (i).

1

(iii) 0.018(2) ×171.3 = 3.12

Do not penalise precision.
If 0.018 used, answer = 3.08

1

×10 = 31.2

Do not penalise precision.
Allow this mark if 0.18(2) used directly.
Correct answer without working scores one mark only.
Allow consequential answer on (ii)

1

(f) Barium sulfate / it is insoluble

Do not accept answers based on small amount ingested.
Do not accept barium.

1

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Q3.

(a) Cross between the Na cross and the Mg cross

1

(b) $Al(g) \rightarrow Al^{+}(g) + e-$
$Al(g) - e- \rightarrow Al^{+}(g)$
$Al(g) + e- \rightarrow Al^{+}(g) + 2e-$

One mark for state symbols consequential on getting equation correct.
Electron does not have to have the – sign on it
Ignore (g) if put as state symbol with e^- but penalise state symbol mark if other state symbols on e^-

2

(c) 2nd/second/2/II

Only

1

(d) Paired electrons <u>in (3)p orbital</u>

Penalise wrong number
If paired electrons repel allow M2

1

repel

1

(e) Neon/Ne

No consequential marking from wrong element

1

$1s^2 2s^2 2p^6$/[He}$2s^2 2p^6$

Allow capital s and p
Allow subscript numbers

1

(f) Decreases

CE if wrong

1

Atomic radius increases/electron removed further from nucleus
or nuclear charge/electron in higher energy level/Atoms
get larger/more shells

Accept more repulsion between more electrons for M2
Mark is for distance from nucleus
Must be comparative answers from M2 and M3
CE M2 and M3 if mention molecules
Not more sub-shells

1

As group is descended more shielding

1

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