

Name of the Student: _____

Max. Marks : 19 Marks

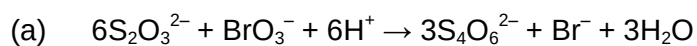
Time : 19 Minutes

Mark Schemes

Q1.
c

[1]

Q2.



Check the formulae and charges carefully and penalise any transcription errors.

Allow multiples and fractions.

Ignore state symbols.

1

(b) Mol of thio = $25.0 \times 0.00100 / 1000 = 2.50 \times 10^{-5}$
and

Mol of bromate(V) = $(1/6) \times 2.5 \times 10^{-5} = 4.17 \times 10^{-6}$

If equation in Q5a is wrong, mark consequentially.

1

Vol of bromate(V) = $(4.17 \times 10^{-6} / 0.005) \times 1000 = 0.83 \text{ cm}^3$

Lose this mark if (correct) unit of volume not given.

Do not penalise precision.

1

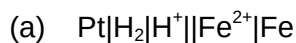
(c) Use a more dilute solution of sodium bromate

Allow 'use a bigger volume of sodium thiosulfate solution'.

1

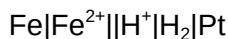
[4]

Q3.



Allow 1 for correct order of symbols but lose second mark for a wrong phase boundary(s) / Pt missing / extra Pt on RHS, additional phase boundary

Note, allow one mark only for correct symbol in reverse:



Allow dashed lines for salt bridge

Ignore state symbols

Ignore 2 if used before H^+

2

(b) Electron donor

Allow (species that) loses electrons

Do not allow reference to electron pairs

1

(c) Cl_2 / chlorine

If M1 blank or incorrect cannot score M2

1

(Species on RHS / electron donor) has most positive / largest $E^\ominus$ / has highest potential

Do not allow reference to e.m.f. or $E(\text{cell})$

1

(d) (i) Cl / chlorine

1

(ii) Chlorine +1 to chlorine 0

CE if chlorine not identified in part (i)

Allow chlorine +1 to chlorine -1 (in Cl^-)

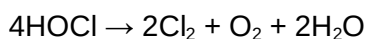
Allow oxidation state decreases by one OR two

Allow oxidation state changes by -1 OR -2

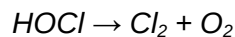
1



OR



Allow one mark for any incorrect equation that shows



Allow multiples

Ignore state symbols

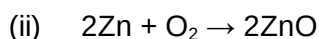
Penalise one mark for uncanceled or uncombined species (eg $\text{H}_2\text{O} + \text{H}_2\text{O}$ instead of $2\text{H}_2\text{O}$)

2

(f) (i) $\text{e.m.f.} = 0.40 - (-1.25) = \underline{1.65} \text{ (V)} / \underline{+1.65} \text{ (V)}$

Allow -1.65 (V)

1



Allow multiples

Ignore state symbols
Do not allow uncanceled species
If more than one equation given, choose the best

1

(iii) A / stainless lid

If M1 incorrect or blank CE=0

1

O₂ (electrode) has a more positive $E^\ominus$ / oxygen (electrode) requires / gains electrons from external circuit

Or reference to the overall equation and a link to electrons going into A

Allow oxygen is reduced and reduction occurs at the positive electrode

OR Zinc (electrode) has more negative $E^\ominus$

Do not allow reference to e.m.f. or E(cell)

1

(iv) (Cell) reaction(s) cannot be reversed / zinc oxide cannot be reduced to zinc by passing a current through it / zinc cannot be regenerated

Allow danger from production of gas / oxygen produced / hydrogen produced

1

[14]