

Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Mark Schemes

Q1.

- (a) **M1** Larger atoms / more electron shells / more shielding / bonding pair of electrons further from the nucleus

M2

weaker attraction between nucleus and bonding pair of electrons /
 weaker attraction between nucleus and shared pair of electrons /
 weaker attraction between nucleus and electron density in the covalent bond

Ignore references to outer electrons

2

- (b) Similarity: one from

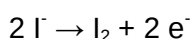
form hydrogen halides / undergo acid-base reaction / misty white fumes are observed / form sodium sulfate / form sodium hydrogensulfate / exothermic / effervescence

Difference: one from

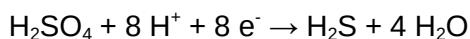
bromide undergoes a redox reaction / bromide ions are oxidised /
 bromide ions reduce sulfur in sulfuric acid / red-brown-orange fumes are observed with bromide / Br₂ produced with bromide / (choking gas) SO₂ produced with bromide / different hydrogen halides

2

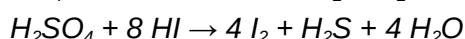
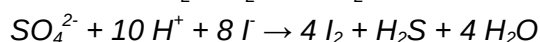
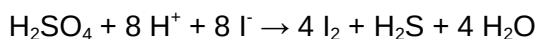
- (c) Half Equation 1:

*Ignore state symbols*

Half Equation 2:



Overall Equation:



3

[7]

Q2.

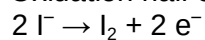
- (a) Electron acceptor / gains electrons

Do not allow

electron pair acceptor / gain of electrons

1

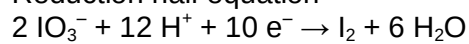
- (b) Oxidation half equation



Allow multiples.

1

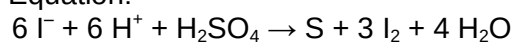
Reduction half equation



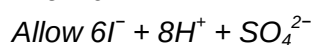
Award 1 mark if the two equations are shown transposed

1

- (c) Equation:



Allow 6HI



1

Foul smelling gas – H_2S / hydrogen sulphide

1

[5]

Q3.

- (a) Identity of gas: Carbon dioxide / CO_2 1

Test: When gas bubbled through limewater, a white ppt formed
When gas bubbled through limewater, it turns milky/cloudy
M2 dependent on M1

1

- (b) Effervescence (with Na_2CO_3), so contains H^+ ions / Effervescence (with Na_2CO_3), so is acidic

The result from Test 1 shows the presence of H^+ / acidic

1

White ppt (with AgNO_3), so contains chloride ions

The result from Test 2 shows the presence of chloride ions.

1

Allow balanced equation for each test that links to each observation

- (c) (Warm with some) NaOH ,

1

Damp red litmus at the mouth of the tube turns blue

Do not allow red litmus dipped in solution

1

Add (acidified) BaCl_2 / $\text{Ba}(\text{NO}_3)_2$

If reagent incorrect, cannot score observation mark

1

White ppt formed

If reagent incomplete, mark on

1

Use of $\text{Ba}(\text{OH})_2$ can score M1 and M3

- (d) The second mass is smaller / the mass after step 4 is smaller than the mass after step 2

1

AgCl dissolves in dilute ammonia / some ppt dissolves as AgCl is soluble in dilute ammonia

The ppt formed by chloride ions dissolves in dilute ammonia.

1

[10]