EXPERIMENT NO. 2

Qualitative Analysis

At each stage of any test you are to record details of the following.

- colour changes seen
- the formation of any precipitate
- the solubility of such precipitates in an excess of the reagent added

Where gases are released they should be identified by a test, **described in the appropriate place in your observations**.

You should indicate clearly at what stage in a test a change occurs.
Marks are **not** given for chemical equations.
No additional tests for ions present should be attempted.

If any solution is warmed, a boiling tube MUST be used.

Rinse and reuse test-tubes and boiling tubes where possible.

Where reagents are selected for use in a test, the name or correct formula of the element or compound must be given.

(a) **FA 6** is a solution of two different salts. It contains two different cations, one of which is listed in the Qualitative Analysis Notes. It contains two anions, both of which are listed in the Qualitative Analysis Notes.

(i) Choose reagents that will allow you to identify one of the cations. Carry out suitable tests using these reagents and record your results in the space below.

tests	Observations
add few drops of aq. NaOH then in excess	white ppt ppt soluble in excess
add few drops of aq. NH_3 then in excess	white ppt ppt soluble in excess

I	
II	
III	
IV	
V	

One of the cations in **FA 6** is $Zn^{2+}_{(aq)}$.

(ii) Carry out the following tests to identify the two anions present in **FA 6**.

test	*observations*
To a 1 cm depth of **FA 6** in a test-tube add a 1 cm depth of aqueous silver nitrate, then	Cream ppt
add aqueous ammonia.	ppt partially soluble / insoluble
To a 1 cm depth of **FA 6** in a test-tube add a 1 cm depth of aqueous barium chloride (or aqueous barium nitrate), then	white ppt
add dilute nitric acid.	ppt remains insoluble

The anions in **FA 6** are $Br^-_{(aq)}$ and $SO_4^{2-}{}_{(aq)}$

[9]

VI	
VII	
VIII	
IX	

(b) **FA 7** is an acidified solution of iron(II) sulfate, $FeSO_4(aq)$.

Carry out the following tests and record your observations.

	test	*observations*
(i)	To a 1 cm depth of **FA 7** in a test-tube add aqueous sodium hydroxide and leave for a few minutes.	green ppt, ppt turns brown in contact with air
(ii)	To a 1 cm depth of **FA 7** in a boiling tube add a 1 cm depth of dilute sulfuric acid followed by a 1 cm depth of '20 vol' hydrogen peroxide. Stir the mixture, then	solution turns yellow/ pale yellow
(iii)	pour a 1 cm depth of the mixture into a clean boiling tube and add a 3 cm depth of aqueous sodium hydroxide.	red brown ppt and bubbles of a colourless gas which relights a glowing splint.

I	
II	
III	
IV	
V	
VI	

(iv) What type of reaction takes place in **(ii)**?

redox reaction

(v) Explain your observations in **(iii)**.

Decomposition of H_2O_2 OR Oxidation of Fe^{2+} to Fe^{3+}.

[6]

[Total: 15]