EXPERIMENT NO. 15

Qualitative Analysis

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

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

- colour changes seen;
- the formation of any precipitate and its solubility in an excess of the reagent added;
- the formation of any gas and its identification by a suitable test.

You should indicate clearly at what stage in a test a change occurs.

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

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

No additional tests for ions present should be attempted.

3 (a) **FA 4** is an aqueous solution containing a single cation and a single anion.
The anion is either the sulfate ion, SO_4^{2-}, or the sulfite ion, SO_3^{2-}.

(i) To an approximately 1 cm depth of **FA 4** in a test-tube, add aqueous sodium carbonate.
Record your observations.

.....

.....

..... [2]

(ii) Select reagents to identify the anion present in **FA 4**.
Carry out a test with these reagents and record your observations.

reagents .....

observations .....

.....

.....
[2]

(iii) Identify **FA 4**.

The formula of **FA 4** is ..... . [1]

(b) (i) **FA 5** contains one cation and two anions. Two of these ions are listed in the Qualitative Analysis Notes.
Carry out the following tests and record your observations.

test	*observations*
Add a small spatula measure of **FA 5** to a hard-glass test-tube. Heat the sample gently at first and then more strongly.	
Pour a 4 cm depth of dilute sulfuric acid into a boiling tube. Carefully add the remaining **FA 5**. Leave to stand until the reaction is complete. The solution produced is **FA 6**. Keep **FA 6** for use in the following tests.	
To a 1 cm depth of **FA 6** in a test-tube add aqueous sodium hydroxide.	
To a 1 cm depth of **FA 6** in a test-tube add aqueous ammonia.	

[5]

(ii) State the type of reaction observed when **FA 5** was heated.

..... [1]

(iii) Give the formula of the cation and one of the anions present in **FA 5**.

cation: ..... anion: ..... [1]

[Total: 12]