EXPERIMENT NO. 14

Qualitative analysis

For each test you should record **all** your observations in the spaces provided.

Examples of observations include:

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

You should record clearly at what stage in a test an observation is made.

Where no change is observed you should write 'no change'.

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

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

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

No additional tests should be attempted.

(a) **(i)** **FA5, FA 6**, **FA 7** and **FA 8** are all aqueous solutions. Each contains one anion and one cation.
Carry out the following tests and record your observations.

tests	*observations*			
	FA 5	**FA 6**	**FA 7**	**FA 8**
To a 1 cm depth of solution in a test tube add few drops of aqueous sodium hydroxide then in excess	green ppt. ppt. turns brown on contact with air ppt remains insoluble in excess	Blue ppt. ppt remains insoluble in excess	Red-brown ppt ppt remains insoluble in excess	no change OR no ppt
if no ppt formed then warm the mixture	—	—	—	a colourless gas that turns damp red litmus paper blue.
To a 1 cm depth of solution in a test tube add few drops of aqueous ammonia then in excess	Green ppt. ppt turns brown on contact with air ppt remains insoluble in excess	Blue ppt. ppt soluble in excess gives a dark blue solution	Red-brown ppt ppt remains insoluble in excess	no change OR no ppt

(b) Perform following tests to identify anions present in **FA 5**, **FA 6**, **FA 7** and **FA 8**.

tests	*observations*			
	FA 5	**FA 6**	**FA 7**	**FA 8**
To a 1 cm depth of solution in a test tube add 1 cm depth of aqueous silver nitrate then	no change OR no ppt	no change OR no ppt	white ppt	white ppt
add aqueous ammonia	–	–	ppt soluble in excess of aq. NH_3	ppt soluble in excess of aq. NH_3
To a 1 cm depth of solution in a test tube add 1 cm depth of aqueous barium chloride then	white ppt	white ppt	no change OR no ppt	no change OR no ppt
add aqueous hydrochloric acid	ppt insoluble in excess of dil HCl	ppt insoluble in excess of dil HCl	–	–

(c) Identify all ions present in **FA 5**, **FA 6, FA 7** and **FA 8** from your observations in **(a)** and **(b)**.

Write the formulae of the ions in Table.

	cations	anions
FA 5	$Fe^{2+}_{(aq)}$	$SO_4^{2-}{}_{(aq)}$
FA 6	$Cu^{2+}_{(aq)}$	$SO_4^{2-}{}_{(aq)}$
FA 7	$Fe^{3+}_{(aq)}$	$Cl^-_{(aq)}$
FA 8	$NH_4^+{}_{(aq)}$	$Cl^-_{(aq)}$