Oxford Cambridge and RSA

GCSE Chemistry A (Gateway Science)

J248/02 C4-C6 and C7 Foundation (Foundation Tier)

Question Set 17

1 A student wants to identify the ions contained in a solid, **X**.

She dissolves the solid in some water and then does some tests on the solution.

Look at the table of her results.

Test	Method	Observations
Test 1	Flame test	Red flame seen
Test 2	Add dilute sodium hydroxide solution	White precipitate forms which re-dissolves in excess sodium hydroxide solution
Test 3	Add dilute nitric acid, then silver nitrate solution	White precipitate forms
Test 4	Add dilute hydrochloric acid, then barium chloride solution	No change – mixture stays clear and colourless

(a) Describe how the student does the flame test in **Test 1**.

You may draw a **labelled** diagram to help your answer.

[3]

Moisten nichrome wire and dip into solution. Introduce the solution into blue flame of Bunsen burner. The flame colour changes from blue to red.

(b)* The student thinks that solid **X** contains only lithium ions, Li^+, and sulfate ions, SO_4^{2-}.

Use her results to explain if she is correct.

[6]

No, because X do not contain SO_4^{2-} because no reaction occured with barium chloride (no white precipitate formed) but Li^+ produces red flame thus X contains Li^+. The result in test 2 shows that either / both Zn^+ or/and Al^{3+} are present. Test 3 observation indicates Cl^- is present in X. As a result, X contains Li^+, Cl^- and possibly Zn^+ and/or Al^{3+}.

Total Marks for Question Set 17: 9