3 A student tests two solids: solid **J** and solid **K**.

Tests on solid J

Solid **J** is lithium chloride.

Record the expected observations.

(a) The student carries out a flame test on solid **J**.

(i) State the colour the Bunsen burner flame becomes during the flame test.

..... [1]

(ii) The student uses a roaring Bunsen burner flame to carry out the flame test.

State why a yellow Bunsen burner flame is **not** suitable for a flame test.

.....

..... [1]

(b) The student dissolves the remaining solid **J** in distilled water to form solution **J**.

The student divides solution **J** into two portions.

(i) To the first portion of solution **J**, the student adds about 1 cm^3 of dilute nitric acid followed by a few drops of aqueous silver nitrate.

observations .....

..... [1]

(ii) To the second portion of solution **J**, the student adds aqueous sodium hydroxide until it is in excess.

observations .....

..... [1]

Tests on solid K

Table 3.1 shows the tests and the student's observations for solid **K**.

Table 3.1

tests	observations
test 1 Heat about half of solid **K** in a boiling tube until there is no further change. Hold anhydrous cobalt(II) chloride paper at the mouth of the boiling tube.	condensation forms at the top of the boiling tube the anhydrous cobalt(II) chloride paper changes colour from blue to pink
test 2 The remaining solid **K** is dissolved in distilled water to form solution **K**. Solution **K** is divided into three portions. To the first portion of solution **K**, add aqueous ammonia dropwise and then in excess.	a green precipitate forms the precipitate remains when excess aqueous ammonia is added
test 3 To the second portion of solution **K**, add 1 cm^3 of dilute nitric acid followed by a few drops of aqueous barium nitrate.	a white precipitate forms
test 4 To the third portion of solution **K**, add 3 cm^3 of aqueous sodium carbonate. Test any gas given off.	effervescence is seen and a green precipitate forms the gas turns limewater milky

(c) State the conclusion that can be made from the observations in **test 1**.

..... [1]

(d) Two different cations can give the observations in **test 2**.

(i) Identify the **two** possible cations that the observations in **test 2** show could be in solid **K**.

.....

..... [2]

(ii) Describe an additional test that can be carried out on solution **K** to confirm which of the two cations you have identified in **(d)(i)** is in solid **K**.

Explain how the result of this test shows which of these two cations is in solid **K**.

test .....

.....

explanation .....

.....
[2]

(e) Identify the gas given off in **test 4**.

..... [1]

(f) Identify the anion in solid **K**.

..... [1]

[Total: 11]