Oxford Cambridge and RSA

GCSE Chemistry B (Twenty First Century Science)

J258/04 Depth in chemistry (Higher Tier)

Question Set 12

1 Alex collects some samples of minerals from a spoil heap near an old mine.

Alex tests two samples of minerals, **A** and **B**, to identify the ions that they contain.

(a) He carries out flame tests on each sample and compares his results (**Table 1.1**) to a reference book of flame colours for some metal ions (**Table 1.2**).

Alex's results

Mineral	Flame colour
A	green
B	orange-red

Table 1.1

Reference book

Metal ion	Flame colour
copper	blue-green
calcium	orange-red
iron	varies with temperature blue/green/yellow/orange
zinc	green

Table 1.2

Use information from **Table 1.1** and **Table 1.2** to explain why Alex cannot be certain which ions are in the samples. **[3]**

(b) Alex makes a solution of a sample of each mineral in water and does some further tests.

The tests he carries out, and his results, are shown in **Table 1.3**.

Mineral	Test	Result
A	Add dilute sodium hydroxide.	blue precipitate
	Add dilute hydrochloric acid.	fizzes, gas given off turns lime water milky
	Add dilute silver nitrate.	white precipitate
B	Add dilute sodium hydroxide.	white precipitate does not dissolve in excess
	Add dilute hydrochloric acid.	no change
	Add dilute silver nitrate.	white precipitate

Table 1.3

(i) Alex thinks that mineral **A** contains two negative ions.
How can you tell from the results that Alex is right? **[1]**

(ii) Identify the ions in mineral **A** and mineral **B**.

Choose words from this list.

copper **calcium** **iron** **zinc** **carbonate** **chloride** **sulfate**

Ions in mineral A	Ions in mineral B
.....	.....
.....	.....
.....	

[3]

(c) Alex also has an emission spectroscopy machine to analyse samples of minerals.

Give **one** advantage of using an emission spectroscopy machine, rather than flame tests or chemical tests, to identify samples. **[1]**

Total Marks for Question Set 12: 8