Chromatography

1 **A company that produces pre-made drinks suspects that a mixture of sugar and caffeine have been contaminated with capsaicin, the compound responsible for the spiciness of chilli peppers. Explain how you would use chromatography to check whether the mixture has been contaminated.** (4 marks, ★★★★)

Identifying metal ions using flame tests, flame emission spectroscopy and sodium hydroxide

1 **One way that some people try to reduce the amount of common salt (sodium chloride) in their diet is to use low sodium salt instead of common salt. Low sodium salt is typically a mixture of sodium chloride and potassium chloride.**

A student did a flame test on a sample of low sodium salt.

a Predict what the student will observe. Explain your answer. (2 marks, ★★)

b The student did not see the flame colour for potassium. Explain why this might be. (2 marks, ★★★)

c Suggest why flame tests are carried out using a roaring flame, rather than a safety flame. (2 marks, ★★)

2 **Give four advantages of flame emission spectroscopy over flame tests.** (4 marks, ★★)

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3 **Match the metal ion to the colour of the precipitate when sodium hydroxide is added to it.** (3 marks, ★)

Name and ion	Colour of precipitate
Magnesium Mg^{2+}	Brown
Calcium Ca^{2+}	White
Aluminium Al^{3+}	White
Copper(II) Cu^{2+}	Green
Iron(II) Fe^{2+}	Blue
Iron(III) Fe^{3+}	White

4 **Sodium hydroxide was added to an unknown metal ion and the precipitate was white. Describe how you could determine the identity of the metal ion.** (3 marks, ★★★)

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