Question 31 (6 marks)

(a) A student collected a 250 mL sample of water from a local dam for analysis. The data collected are shown in the table.

Mass of filter paper	0.23 g
Mass of filter paper and solid	0.47 g
Mass of evaporating basin	43.53 g
Mass of basin and solid remaining	44.67 g

(i) The water was filtered and the filtrate evaporated to dryness. **2**

Calculate the percentage of the total dissolved solids in the dam sample.

mass filter paper & solid − mass filter paper = 0.47 − 0.23 = 0.24 = mass solid

mass evaporating basin & solid − mass evaporating basin = 44.67 − 43.53 = 1.14 = mass solid

∴ mass final solid − mass initial solid = 1.14 − 0.24 = 0.9 = mass dissolved solids

∴ $\frac{0.9\text{g}}{1.14\text{g}} \times 100 = 78.95\%$

(ii) It is suspected that the water in the dam has a high concentration of chloride ions. **2**

Describe a chemical test that could be carried out on the water sample to determine the presence of chloride ions. Include an equation in your answer.

Put $AgNO_3$ in ~~the sample~~ a sample. Observe for a white precipitate which turns brown in sunlight. Presence of this precipitate indicates ~~pres~~ presence of Cl^- in water.

Question 31 continues on page 24

Question 31 (continued)

(b) Name an ion other than chloride that commonly pollutes waterways, and identify its source and the effect of its presence on water quality. 2

Lead ions (Pb^{2+}) can pollute waterways. This can come from factory run-off. Lead is biocidal to marine life & can also cause learning difficulties in children, anaemia & replace calcium in bones of in humans, making it unsafe to drink.

End of Question 31