

**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

solid: 0.24

remaining solid: 1.14

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

remaining after evaporation 2

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

Dissolved solid weight = 1.14

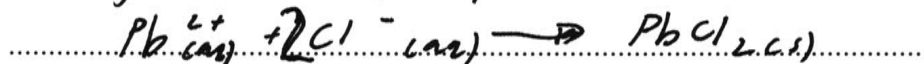
Sample size: 250 mL

$$\% \text{ of TDS} = \frac{1.14}{250} \times 100 = 0.456\%$$

- (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.

Adding lead will precipitate out the Cl ions.



It should form a white precipitate. This can be checked with a confirmation test by heating the precipitate and checking if it dissolves.

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Question 31 (continued)

\* Sulfate ions ( $\text{SO}_4^{2-}$ )

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

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Sulfate ~~phosphate~~ ions ( $\text{SO}_4^{2-}$ ). It can come from agricultural run off from fertilisers. In waterways it can cause eutrophication which can adversely affect waterways, by decreasing the amount of dissolved oxygen. This affects the water's taste and the quality, meaning it becomes uninhabitable for aquatic marine life in the waterway.

End of Question 31