

**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	$\Delta 0.24\text{g}$
Mass of evaporating basin	43.53 g	
Mass of basin and solid remaining	44.67 g	$\Delta 1.14\text{g}$

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

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

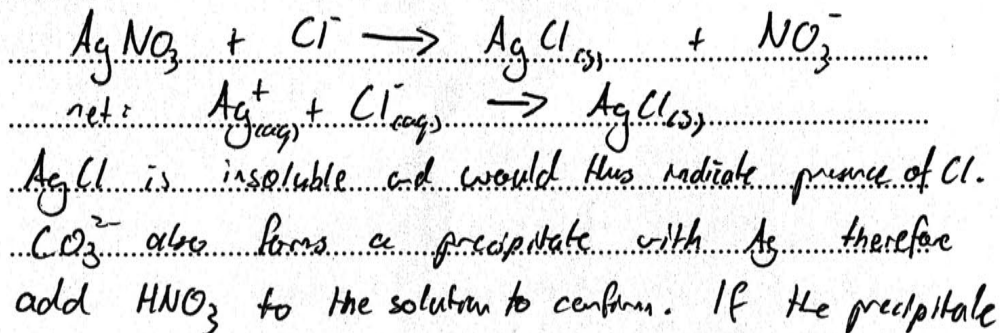
*dissolved solids would pass through filter paper.*

$$\text{TDS} = \frac{1.14\text{g}}{0.250\text{L}} = \frac{4.56\text{g}}{10}$$

$$\% \text{ TDS} = 0.456$$

- (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.



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*dissolves, then it is CO<sub>3</sub><sup>2-</sup>, but if it remains the Cl<sup>-</sup> presence is confirmed.*

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

~~Calcium ions ( $\text{Ca}^{2+}$ ) are often found in water ways due to dissolving of limestone ( $\text{CaCO}_3$ ). A high presence of  $\text{Ca}^{2+}$  causes water to be hard and can prevent soaps from lathering.~~

End of Question 31

A common pollutant in waterways is  $\text{SO}_4^{2-}$ . This is sourced from farm run-offs as fertilisers contain  $\text{SO}_4^{2-}$ . This reacts with water to form sulphuric acid which can reduce the pH of water ways ~~making it require~~ killing aquatic life and ~~making it~~ ~~impossible~~ difficult to treat.