

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.

$$\begin{aligned}
 & \text{solid remaining} = 44.67 \\
 & \quad \quad \quad - 43.53 \\
 & \quad \quad \quad \hline
 & \quad \quad \quad 1.14 \\
 & \text{solid} = \frac{0.47}{0.23} \times 100 = 204.3\% \\
 & \text{Total dissolved solids} = 1.14 + 0.23 = 1.37 \text{ g} \\
 & \text{Percentage} = \frac{1.37}{250} \times 100 = 0.548\% \approx 0.5\%
 \end{aligned}$$

- (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 AgNO_3 to the ^{sample} solution of water if the sample precipitates to a white colour then there is a presence of Cl^- .

$$\text{AgNO}_3 + \text{Cl}^- \rightarrow \text{AgCl} \text{ (white ppt)}$$

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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

~~phosphorus~~ Phosphorus also is a pollutant in
waterways, these ions are evident in soils
so in an event of heavy rain when soil gets
mixed into the waterways or sand the phosphorus levels
go up resulting in a decrease in water
~~quantity~~ quality.

End of Question 31