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:

<table>
<thead>
<tr>
<th>Mass of filter paper</th>
<th>0.23 g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass of filter paper and solid</td>
<td>0.47 g</td>
</tr>
<tr>
<td>Mass of evaporating basin</td>
<td>43.53 g</td>
</tr>
<tr>
<td>Mass of basin and solid remaining</td>
<td>44.67 g</td>
</tr>
</tbody>
</table>

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

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

\[
\text{Percentage of TDS} = \frac{0.91}{250} \times 100
\]

(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.

To determine the presence of chloride ions in a water sample, adding AgNO₃ in solution as

\[
\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl (s)} + \text{NaNO}_3 (aq)
\]

A precipitate of AgCl will form in solution indicating the presence of Cl⁻ ions.

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

Phosphate ions are another ion that commonly pollutes waterways. 

Phosphate ions are derived from fertilisers and detergents containing phosphate. Phosphate ions can 

...interact to eutrophication and algal blooms which affects water quality increasing biological oxygen demand hinting presence of living things in water.

End of Question 31