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.

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

\[
\text{the total dissolved solids is equal to:} \quad \frac{1.143 \text{ g}}{250 \text{ mL}} \times 100
\]

\[
= 0.456\%
\]

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

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.

If you add silver nitrate and a precipitate forms, Cl\textsuperscript{-} ions could be present.

\[
\text{AgNO}_3 + \text{Cl}^- \rightarrow \text{AgCl} + \text{NO}_3^{-}
\]

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

Phosphorus...sometimes as a builder in...detergents that if it gets leached...out in the water could cause...eutrophication...algal blooms which...can kill off marine life and water plants that...rely on photosynthesis.

End of Question 31