

## 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

} 0.24g  
} 1.14g.

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

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

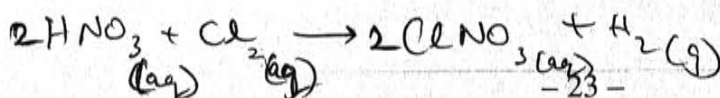
$$\begin{aligned}
 & 250 \text{ mL} - 0.24 \text{ g} = 249.76 \text{ mL (sample of water)} \\
 & \text{Solid} = 44.67 - 43.53 = 1.14 \text{ g} \\
 \therefore \text{TDS} &= \frac{1.14}{249.76} \times 100 \\
 &= 0.46\%
 \end{aligned}$$

- (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.

Flame testing can be used to find out the presence of chlorides.  $\text{AgNO}_3$  is added to the sample. A precipitate should form. To this precipitate,  $\text{HNO}_3$  should be added and it should still form a precipitate (must not dissolve). This proves that  $\text{Cl}^-$  ions are present in the water.

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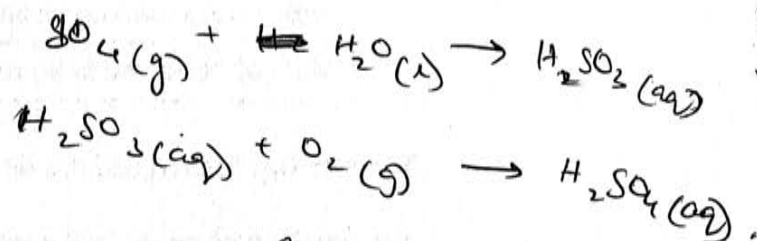
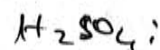


## Question 31 (continued)

- (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

Another ion includes sulfates; sulfates can accumulate in the water and it can result in damage done to the ~~the~~ aquatic / marine life. Sulfates can become acidic when in water; as they can originate from ~~the~~ gases such as  $\text{SO}_2$  (oxides) which result in industries' smoke-stack emissions and form

End of Question 31



When it becomes acidic, it ~~can~~ <sup>can</sup> disrupt the pH of the water in which marine life are adjusted to surviving. ~~However~~ However, the change in pH can ~~to~~ affect the growth of organisms as well as kill them. Furthermore, it can affect phytoplankton which ~~can~~ <sup>kills many organisms</sup> produces oxygen through <sup>photo</sup>synthesis and can result in deprived oxygen levels, for survival.