

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

} 0.24
} 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.

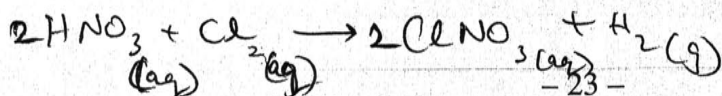
$$\begin{aligned}
 & 250 \text{ mL} - 0.24 \text{ g} = 249.76 \text{ mL (sample of water)} \\
 & \text{Solid} = 44.67 - 43.53 = 1.14 \text{ g} \\
 \therefore \text{TDS} &= \frac{1.14}{249.76} \times 100 \\
 &= 0.46\%
 \end{aligned}$$

- (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.

~~Fluoride~~ testing can be used to find out the presence of chlorides. AgNO_3 is added to the sample. A precipitate should form. To this precipitate, HNO_3 ~~is~~ should be added and it should still form a precipitate (must not dissolve). This proves that Cl^- ions are present in the water.

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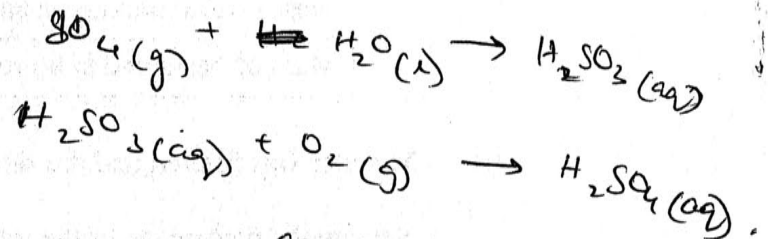
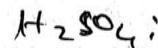


Question 31 (continued)

- (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 SO_2 (oxides) which result in industries' smoke-stack emissions and form

End of Question 31



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