

**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

} solid = 0.23

} 1.14

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

2

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

assuming 1g = 1ml

mass of solid = $0.47 - 0.23 = 0.23\text{g}$	} percentage of TDS = $\frac{0.91}{250} \times 100$ = 0.364 = 0.36%
mass of solid after evaporation = 1.14	
$\therefore$ mass of solid = $1.14 - 0.23 = 0.91\text{g}$	
$\therefore$ assuming 1g = 1ml	

- (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 presence of chloride ions in water sample, adding  $\text{AgNO}_3$  in solution is

$$\text{Cl}^- + \text{AgNO}_3 = \text{AgCl(s)} + \text{NO}_3^- (\text{aq})$$

A precipitation of  $\text{AgCl}$  will form in solution indicating presence of  $\text{Cl}^-$  ions.

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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

Phosphate ions ( $\text{PO}_4^{3-}$ ) is another ion that commonly pollutes waterways. ~~can be~~ Derived from fertilisers and detergents containing phosphate. Phosphate ions can ~~inver~~ lead to Eutrophication and algal blooms which affects water quality increasing Biological oxygen demand ~~and decreasing oxygen~~ hinting presence of living things in water.