

Question 26 (5 marks)

Water can be described as either 'hard' or 'soft'.

- (a) Describe a test you have used to determine whether a given sample of water is 'hard' or 'soft'. 2

A turbidity test can assist in determining the levels of dissolved solids.

A tube with a clear image printed on the inside of the bottom is filled with water.

Turbidity is measured with a comparison of the amount of water and the visibility of the image.

- (b) A sample of hard water contains $6 \times 10^{-4} \text{ mol L}^{-1}$ of magnesium carbonate. 3

Calculate the mass, in mg, of magnesium carbonate in 150 mL of this sample.

1 L contains $6 \times 10^{-4} \text{ mol of MgCO}_3$.

\therefore 0.15 L contains $0.15 \times 6 \times 10^{-4} \text{ mol of}$

$\text{MgCO}_3 = 9 \times 10^{-5} \text{ mols}$

$n = \frac{m}{M} \therefore m = 9 \times 10^{-5} \times 84.32$

$= 7.5888 \times 10^{-3}$

$= 0.0075888 \text{ g}$

$= 7.5888 \text{ mg}$