

## 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

Hard water contains heavy metals, which make it hard to lather with soap. To test this, mix a sample of water with some soap. The amount of lather will determine whether the water is hard (little or no lather) or soft (a great or reasonable amount of lather).

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

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

Magnesium Carbonate

$$\text{MgCO}_3 = 24.31 + 12.01 + (16.00 \times 3)$$

$$= 84.32$$

$$\frac{6 \times 10^{-4}}{150} \times 84.32$$

$$= 3.37 \text{ mg}$$