

Question 26 (5 marks)

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

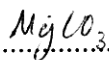
- (a) Describe a test you have used to determine whether a given sample of water is 'hard' or 'soft'. 2

Froth formation. Soap 50 mg of soap was added to 250 ml of water in a volumetric flask. The water was shaken until bubbles formed. The amount of bubbles formed determined the "hardness" or "softness" of the water.

- (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.

$$\text{mol} = \frac{m}{\text{f.m.}}$$



$$V \times m = \text{moles}$$

$$6 \times 10^{-4} = \frac{150}{64.32}$$

$$150 \times m = 6 \times 10^{-4}$$

$$m = \frac{6 \times 10^{-4}}{0.150}$$

$$= 4 \times 10^{-3}$$

$$\therefore 4 \times 10^{-3} \text{ mg of MgCO}_3$$