

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

Water hardness depends on the  $Mg^{2+}$  and  $Ca^{2+}$  concentrations. This can be determined by ~~distilling~~ <sup>adding</sup> a carbonate solution and measuring the precipitate ~~or~~ formed.

- (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.

$$n = \frac{M}{m} \quad 6 \times 10^{-4} = \frac{24 + 12 + 3 \times 16}{m}$$

$$= 140000 \text{ mg/L}$$

$$= 12036$$