Marks

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**

~~You can use a Shechi disk with a black swirl on a white background.~~
A test for 'hard' or 'soft' water is the lathering of soap. If it lathers well the water is soft, and if not then it is hard.

(b) A sample of hard water contains 6×10^{-4} mol L^{-1} of magnesium carbonate. **3**

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

$n = \frac{m}{FW}$

~~$MgCl_2$~~
$MgCO_3$

no. of L in sample = 0.15L

no. of moles of magnesium carbonate in sample = $6 \times 10^{-4} \times 0.15$

= 0.00009 moles

m(magnesium carbonate) = n × FW

= 0.00009 × 68.32

= 0.006...

≈ 0.006 g

= 6.1488 mg

FW = 24.31 + 12.01 + 32 =

∴ the mass of magnesium carbonate is 6.1488 mg