Oxford Cambridge and RSA

GCSE Chemistry B (Twenty First Century Science)

J258/03 Breadth in chemistry (Higher Tier)

Question Set 12

1 Sulfuric acid is used in car batteries.

Mia has a sample of car battery acid that is diluted to 1/100 of its original concentration.

She measures the concentration of this acid by titration.

(a) This equation shows what happens when pure sulfuric acid is mixed with water.

$H_2SO_4(l) \rightarrow 2H^+(aq) + SO_4^{2-}(aq)$

Explain how this equation shows that sulfuric acid is a **strong** acid. **[1]**

(b) Mia does a titration.

She puts the sulfuric acid in a burette.

She measures out 25.0 cm^3 of 0.100 mol / dm^3 NaOH.

(i) She wants to measure the 25.0 cm^3 of NaOH as accurately as possible.

Which piece of apparatus should Mia use?

Put a (ring) around the correct answer.

conical flask **100 cm^3 measuring cylinder**

volumetric pipette **volumetric flask** **[1]**

(ii) Calculate the number of moles in 25.0 cm^3 of 0.100 mol / dm^3 NaOH.

Use the equation:
concentration (mol / dm^3) = number of moles of solute ÷ volume (dm^3)

Number of moles = ... mol **[3]**

(iii) This is an equation for sulfuric acid reacting with NaOH.

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

Mia finds that 24.5 cm^3 of H_2SO_4 reacts exactly with the NaOH.

Calculate the concentration of the sulfuric acid in the burette in mol / dm^3.

Use the equation:
concentration (mol / dm^3) = number of moles of solute ÷ volume (dm^3)

Give your answer to **2** significant figures.

Concentration = ... mol / dm^3 **[3]**

Total Marks for Question Set 12 : 8