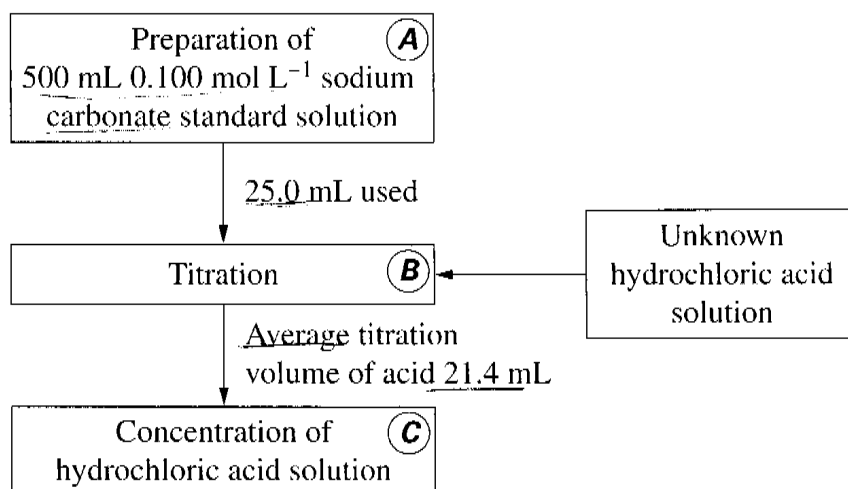


**Question 28** (8 marks)

The flowchart shown outlines the sequence of steps used to determine the concentration of an unknown hydrochloric acid solution. 8



Describe steps **A**, **B** and **C** including correct techniques, equipment and appropriate calculations. Determine the concentration of the hydrochloric acid.

Step A: 1. Weigh out required mass of  $\text{Na}_2\text{CO}_3$  on filter paper

$$n(\text{Na}_2\text{CO}_3) = c \times v = 0.5 \times 0.1 = 0.05$$

$$\therefore \text{mass} = 0.05 \times ((22.99 \times 2) + (16 \times 3) + 12.01) = 5.2995 \text{ grams}$$

2. Put in clean <sup>500 mL</sup> volumetric flask (cleaned with distilled water)

3. Add distilled water to dissolve all solid.

4. ~~Put lid on~~ & fill to until meniscus sits above mark with distilled water. Put lid on &

invert 5 times (to ensure all  $\text{Na}_2\text{CO}_3$  is dissolved & mixed).

Step B: 1. Rinse out burette with ~~distilled water~~, & then with unknown HCl acid solution. Once rinsed, discard ~~reading~~.

Question 28 continues on page 18