**Question 28 (8 marks)**

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

1. **Preparation of A**
   - 500 mL 0.100 mol L⁻¹ sodium carbonate standard solution
   - Use Na₂CO₃
   - 25.0 mL used

2. **Titration B**
   - Average titration volume of acid 21.4 mL

3. **Concentration of C**
   - Unknown hydrochloric acid solution

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

\[
\text{Mass required to make standard solution} = \text{mol} = \frac{0.05 \times 500}{1000} = 0.025 \text{ mol}
\]

\[
\text{Mass of Na₂CO₃} = 0.025 \times \left( \frac{106 + 2 \times 14}{2} \right) = 5.4995 \approx 5.50 \text{ g}
\]

**Step 1: Making standard solution**
- Weigh exactly 5.50 g of anhydrous sodium carbonate and transfer it to a clean beaker. (Use a dessicator if necessary to remove all the moisture in the sublimates.
- Add 100 mL of water and dissolve the sodium carbonate. Note...
- Transfer the solution slowly into a clean volumetric flask (500 mL).
- Use warm water to wash all the remaining solution into the flask.

**Question 28 continues on page 18**