

## Year 12 Acids and Bases 2

1. Write equations for each reaction and calculate the volume of  $0.500 \text{ mol L}^{-1}$  sodium hydroxide solution required to neutralise

- (a) 100.0 mL of  $2.00 \text{ mol L}^{-1}$  hydrochloric acid,
- (b) 150.0 mL of  $1.50 \text{ mol L}^{-1}$  ethanoic (acetic) acid,
- (c) 20.0 mL of  $0.250 \text{ mol L}^{-1}$  sulfuric acid, and
- (d) 75.0 mL of  $0.800 \text{ mol L}^{-1}$  phosphoric acid.

(16 marks)

2. Write equations for each reaction and calculate the volume of  $0.200 \text{ mol L}^{-1}$  sulfuric acid required to neutralise

- (a) 200.0 mL of  $0.600 \text{ mol L}^{-1}$  sodium hydroxide solution.
- (b) 50.0 mL of  $0.100 \text{ mol L}^{-1}$  barium hydroxide solution.

(8 marks)

3. In a titration,  $0.105 \text{ mol L}^{-1}$  hydrochloric acid is used to standardise a potassium hydroxide solution using phenolphthalein as an indicator. 21.1 mL of the hydrochloric acid is needed to neutralise 25.0 mL of potassium hydroxide solution. What is the concentration of the potassium hydroxide solution?

(4 marks)

4. A 5.00 mL sample of sulfuric acid from a lead-acid accumulator or car battery required 22.2 mL of  $2.00 \text{ mol L}^{-1}$  sodium hydroxide for complete neutralisation. Calculate the concentration of the sulfuric acid in the battery.

(4 marks)

5. The concentration of an unknown sodium carbonate solution was to be determined by titration with  $1.00 \text{ mol L}^{-1}$  nitric acid using methyl orange indicator. 3.5 mL of nitric acid was added to 25.0 mL of sodium carbonate solution when a colour change from yellow to red indicated the end-point of the titration. What is the concentration of the sodium carbonate solution?

(4 marks)