

Core Worksheet – Chapter 11

- 1** Explain the difference between accuracy and precision. [2]
- 2** Round the following numbers to three significant figures. [7]
- | | | | | | |
|----------|------------|----------|-------------|----------|---------|
| a | 1.0178 | d | 0.054007 | g | 0.49949 |
| b | 0.0067890 | e | 0.0038999 | | |
| c | 0.00200005 | f | 0.000499999 | | |
- 3** Work out the percentage uncertainties for each of the following quantities. [3]
- | | |
|----------|--|
| a | 20.2 ± 0.1 |
| b | $1.78 \times 10^{-3} \pm 1 \times 10^{-3}$ |
| c | 0.0024 ± 0.0006 |
- 4** Calculate the absolute uncertainties given the following values and percentage uncertainties and quote the final value to the appropriate number of significant figures. [4]
- | | |
|----------|---------------------------|
| a | $25.7849203 \pm 0.15\%$ |
| b | $0.0178359273 \pm 0.67\%$ |
- 5** Work out the following calculations and quote the final answer with an absolute uncertainty. [1]
- | | | |
|----------|--|-----|
| a | $67.2 \pm 0.1 + 38.5 \pm 0.3$ | [1] |
| b | $0.0257 \pm 0.002 - 0.0120 \pm 0.002$ | [1] |
| c | $4.17 \pm 0.04 \times 0.272 \pm 0.002$ | [3] |
| d | $\frac{25.78 \pm 0.01}{1.685 \pm 0.002}$ | [3] |
- 6 a** Calculate the enthalpy change of solution of lithium chloride given the following data: [6]
- volume of water: $100 \pm 1 \text{ cm}^3$
- initial temperature of water: $9.1 \pm 0.2 \text{ }^\circ\text{C}$
- maximum temperature of solution: $22.8 \pm 0.2 \text{ }^\circ\text{C}$
- specific heat capacity of water: $4.18 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$
- mass of lithium chloride: $2.0 \pm 0.1 \text{ g}$
- b** The actual value for the enthalpy change of solution of lithium chloride is $-37.2 \text{ kJ mol}^{-1}$. Calculate the percentage error for the experiment in part a and comment on whether there are likely to systematic errors in this experiment. [4]

- 7 Describe the relationship between rate and concentration shown by the graph below and calculate the slope (gradient) of the graph.

[3]

