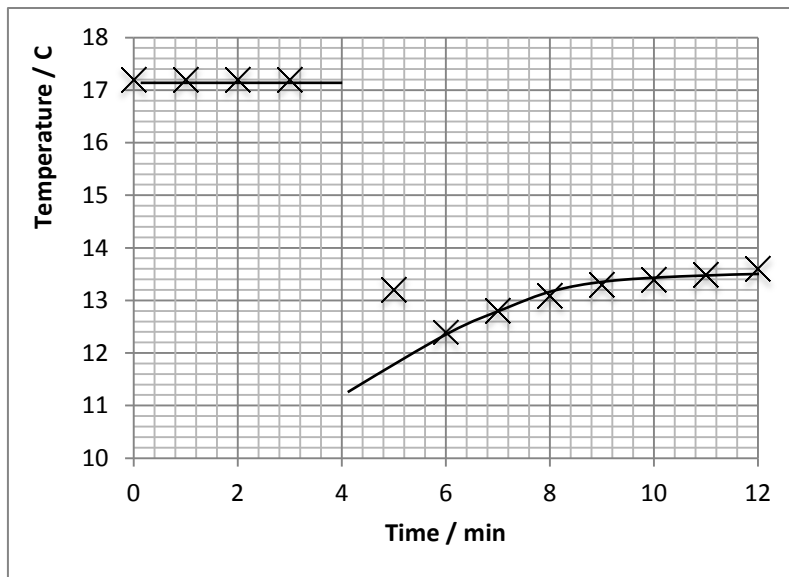


Question	Marking Guidance	Mark	Comments
3.1	<p><b>M1</b> moles (<math>= \frac{25}{1000} \times 2.0</math>) = 0.050</p> <p><b>M2</b> heat released = 0.050 x 56.1 (= 2.805 kJ or 2805 J)</p> <p><b>M3</b> <math>\Delta T = \frac{q}{mc}</math></p> <p><b>M4</b> <math>\Delta T = \frac{2805}{50 \times 4.18}</math> or <math>\frac{1000 \times 0.050 \times 56.1}{50 \times 4.18} = 13(.4) (^{\circ}\text{C})</math></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Correct answer (to at least 2 sig fig) scores 4 marks</p> <p>27 or 26.8°C (from moles of two reagents being added together for <b>M2</b>, or use of 25 cm<sup>3</sup> in <b>M4</b>) scores 3 marks</p> <p>0.013(.4)°C (from not converting kJ to J) scores 3 marks (loses <b>M4</b>) [0.027 or 0.0268°C would score 2 marks (loses <b>M2</b> and <b>M4</b>)</p> <p><b>M1</b> moles can be shown for either substance or without specifying the substance; if it is shown for both substances, must be correct for both for <b>M1</b></p> <p>Allow ECF from <b>M1</b> to <b>M2</b></p> <p>Allow ECF from <b>M2</b> to <b>M4</b> (providing an attempt to calculate q has been made – no ECF if 56100 or 56.1 is used as q)</p> <p>Correct <b>M4</b> scores <b>M3</b>. If error made in <b>M4</b>, <b>M3</b> could score from substituted values in this expression in <b>M4</b></p> <p><b>M4</b> final answer to at least 2 sig fig.</p> <p>Penalise <b>M4</b> for negative temperature rise</p>

3.2

**M1** draws suitable best fit curve to 4 minutes

**M2**  $(17.2 - \text{value read from graph line at 4 minutes}) \pm 0.2$   
 (°C)

1

**M1** line must be a curve and ignore value at 5 minutes

1

**M1** line should not go to times before 4 minutes

**M2** allow use of any curved or straight line that is an attempt to draw a line through the values after 4 minutes (that may include the point at 5 minutes)

**M2** allow negative values