

U5 HW6 SPEC HT FITCH ①

1.  $200\text{g H}_2\text{O} = M$   $\Delta t = 80^\circ - 10^\circ = 70^\circ\text{C}$   
 $Q = M \cdot c \cdot \Delta t = (200\text{g}) \times \frac{1\text{CAL}}{\text{g}^\circ\text{C}} \times (70^\circ) = 14000\text{CAL}$

2.  $200\text{g Al} = M$   $\Delta t = 50^\circ\text{C}$   $c_{\text{Al}} = .22\text{CAL/g}^\circ\text{C}$   
 $Q = (200\text{g}) \times \frac{.22\text{CAL}}{\text{g}^\circ\text{C}} \times (50^\circ) = 2200\text{CAL}$

3.  $Q = 75\text{CAL}$   $M = 10\text{g}$   $\Delta t = 30^\circ\text{C}$   $c = ?$   
 $\frac{Q}{M \Delta t} = c$   $c = \frac{75\text{CAL}}{(10\text{g}) \times (30^\circ\text{C})} = .25\frac{\text{CAL}}{\text{g}^\circ\text{C}}$

4.  $M = 40\text{g}$   $\Delta t = 160^\circ - 26^\circ = 134^\circ\text{C}$   $c_{\text{Fe}} = .11\frac{\text{CAL}}{\text{g}^\circ\text{C}}$   
 $Q = (40\text{g}) \times \frac{.11\text{CAL}}{\text{g}^\circ\text{C}} \times (134^\circ) = 589.6\text{CAL}$

5.  $M = 4000\text{g}$   $\Delta t = 150^\circ - 26^\circ = 124^\circ\text{C}$   $c = .11\frac{\text{CAL}}{\text{g}^\circ\text{C}}$   
 $Q = (4000\text{g}) \times (124^\circ) \times \frac{.11\text{CAL}}{\text{g}^\circ\text{C}} = 67760\text{CAL}$

6.  $M = 160\text{g}$   $\Delta t = 60^\circ\text{C}$   $c_{\text{glass}} = .16\frac{\text{CAL}}{\text{g}^\circ\text{C}}$   
 $Q = (160\text{g}) \times (60^\circ) \times \frac{.16\text{CAL}}{\text{g}^\circ\text{C}} = 1536\text{CAL}$

7.  $M = 120\text{g}$   $\Delta t = 50^\circ\text{C}$   $c = 1\frac{\text{CAL}}{\text{g}^\circ\text{C}}$   
 $Q = (120\text{g}) \times (50^\circ) \times \frac{1\text{CAL}}{\text{g}^\circ\text{C}} = 6000\text{CAL}$

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8.  $M = 4110 \text{ g}$   $\Delta t = 660^\circ - 25^\circ = 635^\circ\text{C}$   $C_{Al} = \frac{.22 \text{ cal}}{\text{g}^\circ\text{C}}$

$$q = (4110 \text{ g}) (635^\circ\text{C}) \left( \frac{.22 \text{ cal}}{\text{g}^\circ\text{C}} \right) = 574167 \text{ cal}$$

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9.  $M = 4.66 \text{ g CCl}_4$   $\Delta t = 57^\circ\text{C}$   $C = \frac{.201 \text{ cal}}{\text{g}^\circ\text{C}}$

$$q = (4.66 \text{ g}) (57^\circ\text{C}) \left( \frac{.201 \text{ cal}}{\text{g}^\circ\text{C}} \right) = 53.39 \text{ cal}$$

10. 250 ml ethanol  $C_{ethanol} = \frac{.58 \text{ cal}}{\text{g}^\circ\text{C}}$  Density = .8 g/ml

$$\Delta t = 18.7^\circ - 10.2^\circ = 8.5^\circ\text{C}$$

$$(250 \text{ ml}) \left( \frac{.8 \text{ g}}{\text{ml}} \right) = 200 \text{ g ETHANOL}$$

$$q = (200 \text{ g}) (8.5^\circ\text{C}) \left( \frac{.58 \text{ cal}}{\text{g}^\circ\text{C}} \right) = 986 \text{ cal}$$

11. 20 L  $\text{H}_2\text{O}$   $t_i = 20^\circ\text{C}$   $t_f = ?$   $\rho = 200 \text{ kg/CAL} = 200,000 \text{ CAL}$

$$(20 \text{ L H}_2\text{O}) \left( \frac{1000 \text{ ml}}{\text{L}} \right) \left( \frac{1 \text{ g}}{\text{ml}} \right) = 20,000 \text{ g H}_2\text{O} \quad C_w = \frac{1 \text{ cal}}{\text{g}^\circ\text{C}}$$

$$\frac{q}{M \cdot C} = \Delta t = \frac{200,000 \text{ cal}}{(20,000 \text{ g}) \left( 1 \frac{\text{cal}}{\text{g}^\circ\text{C}} \right)} = 10^\circ\text{C} \quad \left( \frac{1}{1^\circ\text{C}} = 1 \right)$$

$$50 \Delta t = t_f - t_i \Rightarrow 10^\circ = t_f - 20^\circ$$

$$= 30^\circ\text{C} = t_f$$

$$10^\circ = t_f - 20^\circ$$

$$+20 \quad +20$$

$$30 = t_f$$

12. 20 L METHANOL (METHANOL  $\frac{59 \text{ CAL}}{g \cdot ^\circ\text{C}}$  DENSITY =  $\frac{.8 \text{ g}}{\text{ml}}$ ) (3)

$$t_i = 20^\circ\text{C} \quad q = 200,000 \text{ CAL} \quad t_f = ?$$

$$(20000 \text{ ml}) \left( \frac{.8 \text{ g}}{\text{ml}} \right) = 16000 \text{ g METHANOL}$$

$$\frac{q}{MC} = \Delta t = \frac{200,000 \text{ CAL}}{(16000 \text{ g}) \left( \frac{.59 \text{ CAL}}{g \cdot ^\circ\text{C}} \right)} = 21.19^\circ\text{C}$$

$$21.19 = t_f - 20$$

$$20 + 21.19 = t_f$$

$$\boxed{20 + 21.19 = 41.19^\circ\text{C}}$$

