

# CALVIN

1)  $q = m \cdot \Delta T \cdot C_p$

energy (J)      mass (g)      change in temp. ( $^{\circ}\text{C}$ )      specific heat ( $\text{J/g}\cdot^{\circ}\text{C}$ )

2) Energy to raise 1g of something by  $1^{\circ}\text{C}$

3) Reasonable...

4)  $q = 4,555 \text{ J}$   
 $C_p = 0.46 \text{ J/g}\cdot^{\circ}\text{C}$   
 $\Delta T = 5.5^{\circ}\text{C}$   
 $m = ?$

$q = m \cdot \Delta T \cdot C_p$

$m = \frac{q}{\Delta T \cdot C_p} = \frac{(4,555 \text{ J})}{(5.5^{\circ}\text{C})(0.46 \text{ J/g}\cdot^{\circ}\text{C})} = \boxed{1,800 \text{ g}}$

5)  $q = ?$   
 $m = 18.2 \text{ g}$   
 $C_p = 0.227 \text{ J/g}\cdot^{\circ}\text{C}$   
 $\Delta T = 24.5^{\circ}\text{C}$

$q = m \cdot \Delta T \cdot C_p$

$q = (18.2 \text{ g})(24.5^{\circ}\text{C})(0.227 \text{ J/g}\cdot^{\circ}\text{C}) =$

$\boxed{101 \text{ J}}$

OR

~~101 J~~  
 $\boxed{-101 \text{ J}}$

6)  $\Delta T = 24.5^\circ\text{C}$   
 $q = 2,200\text{ J}$   
 $m = 100.00\text{ g}$   
 $C_p = ?$

$$q = m \cdot \Delta T \cdot C_p$$

$$C_p = \frac{q}{m \cdot \Delta T} = \frac{(2,200\text{ J})}{(100.00\text{ g})(24.5^\circ\text{C})} = 0.898\text{ J/g}\cdot^\circ\text{C}$$

Aluminum

7)  $m = ?$   
 $\Delta T = 30.0^\circ\text{C}$   
 $q = 12,000\text{ J}$   
 $C_p = 4.186\text{ J/g}\cdot^\circ\text{C}$

$$q = m \cdot \Delta T \cdot C_p$$

$$m = \frac{q}{\Delta T \cdot C_p} = \frac{(12,000\text{ J})}{(30.0^\circ\text{C})(4.186\text{ J/g}\cdot^\circ\text{C})} = 95.6\text{ g}$$

8)  $q = 333\text{ J}$   
 $m = 125\text{ g}$

$$q = m \cdot \Delta T \cdot C_p$$

$\Delta T$   $\left\{ \begin{array}{l} T_i = 25.0^\circ\text{C} \\ T_f = ? \end{array} \right.$   
 $C_p = 0.9\text{ J/g}\cdot^\circ\text{C}$

$$\Delta T = \frac{q}{m \cdot C_p} = \frac{(333\text{ J})}{(125\text{ g})(0.9\text{ J/g}\cdot^\circ\text{C})} = 2.96^\circ\text{C}$$

$$+ 25.0$$

$$\boxed{27.96^\circ\text{C}}$$

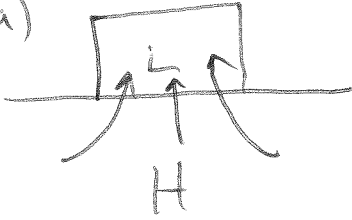
9) heat  $\sim$  total KE      temp.  $\sim$  average KE

10)  $C_u \sim 0.385$   
 $Sand \sim 0.835$   
 $H_2O \sim 4.186$

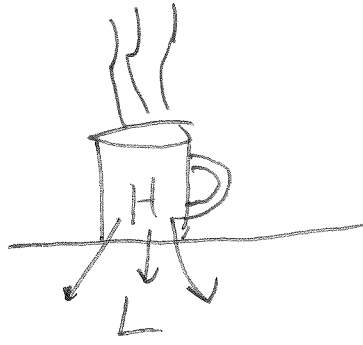
$Cu, Sand, H_2O$

11) Reasonable ...

12) a)



b)



13) heat goes  $H \rightarrow L$

14) "hot air rises"

15) Reasonable ...