

4. 0.412g Ca  
200.0g H<sub>2</sub>O =

$$T_i = 18.9^\circ\text{C}$$

$$T_f = 24.0^\circ\text{C}$$

$$\Delta T = T_f - T_i \\ 24.0^\circ\text{C} - 18.9^\circ\text{C} \\ = 5.1^\circ\text{C}$$

$$0.412\text{g Ca} \times \frac{1\text{mol}}{40.08\text{g}} = 0.0103\text{mol}$$

$$\Delta H_r = \frac{m \times c \times T}{\text{mol}}$$

$$q_{\text{Ca}} = -q_{\text{H}_2\text{O}}$$

$$n \Delta H_r = m \times c \times \Delta T$$

$$0.0103\text{mol} \Delta H_r = \frac{200\text{g} \times 4.18\text{ J/g}^\circ\text{C} \times 5.1^\circ\text{C}}{0.0103\text{mol}}$$

$$= 413941$$

$$= 4.14 \times 10^5 \text{ J/mol}$$

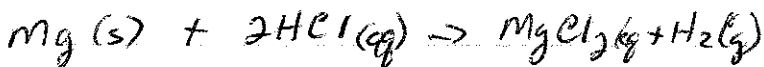
5. 100.0g HCl(l)

0.450g Mg(s)

$$T_i = 17.5^\circ\text{C}$$

$$T_f = 39.6^\circ\text{C}$$

$$\Delta T = T_f - T_i \\ 39.6^\circ\text{C} - 17.5^\circ\text{C} \\ = 22.1$$



$$0.450\text{g Mg} \times \frac{1\text{mol}}{24.31\text{g}} = 0.0185\text{mol Mg}$$

$$q_{\text{reaction}} = -q$$

$$n \Delta H_r = m C \Delta T$$

$$= \frac{100\text{g} \times 4.18\text{ J/g}^\circ\text{C} \times 22.1^\circ\text{C}}{0.0185\text{mol}}$$

$$= 499340 \text{ J/mol}$$

$$= 4.99 \times 10^5 \text{ J/mol}$$