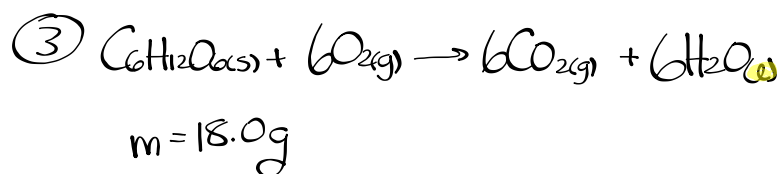


## Homework - Questions??



Step 1:  $H_r$  (general)

$$\Delta H_r = \sum n H_{fP} - \sum n H_{fR}$$

$$= \left[ (6 \text{ mol}) \left( -393.5 \frac{\text{kJ}}{\text{mol}} \right) + (6 \text{ mol}) \left( -285.8 \frac{\text{kJ}}{\text{mol}} \right) \right] -$$

$$\left[ (1 \text{ mol}) \left( -1273.1 \frac{\text{kJ}}{\text{mol}} \right) + (6 \text{ mol}) \left( 0 \frac{\text{kJ}}{\text{mol}} \right) \right]$$

$$\Delta H_r = -2802.7 \text{ kJ}$$

$$H_r = \frac{\Delta H_r}{n} = \frac{-2802.7 \text{ kJ}}{1 \text{ mol}} = -2802.7 \frac{\text{kJ}}{\text{mol}}$$

Step 2:  $n$  (specific)

$$18.0 \text{ g C}_6\text{H}_{12}\text{O}_6 \times \frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{180.18 \text{ g C}_6\text{H}_{12}\text{O}_6} = 0.100 \text{ mol C}_6\text{H}_{12}\text{O}_6$$

Step 3:  $\Delta H_r$  (specific)

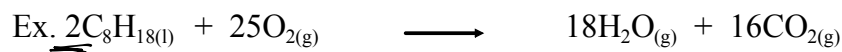
$$\Delta H_r = n H_r$$

$$\Delta H_r = (0.100 \text{ mol}) \left( -2802.7 \frac{\text{kJ}}{\text{mol}} \right)$$

$$\boxed{H_{III} = -280. \text{ kJ}}$$

## Sample Problem

What mass of **octane** is completely burned during the heating of 20.L of aqueous ethylene glycol automobile coolant from  $-10.^{\circ}\text{C}$  to  $70.^{\circ}\text{C}$ ? The volumetric heat capacity of aqueous ethylene glycol is  $3.7 \text{ kJ/L}^{\circ}\text{C}$ .



Step 1:  $H_r$  (general)

$$\Delta H_r = \sum n H_{f,p} - \sum n H_{f,r}$$

$$\Delta H_r = -10148.2 \text{ kJ}$$

$$H_r = \frac{\Delta H_r}{n} = \frac{-10148.2 \text{ kJ}}{2 \text{ mol}} = \underline{\underline{-5074.1 \text{ kJ/mol}}}$$

Step 2:  $n$  (specific)

$$\Delta H_r = -q$$

$$n H_r = -v C \Delta T$$

$$n \left( -5074.1 \frac{\text{kJ}}{\text{mol}} \right) = -(20.\text{L}) \left( 3.7 \frac{\text{kJ}}{\text{L}^{\circ}\text{C}} \right) (80.^{\circ}\text{C})$$

$$n = \underline{\underline{1.1667 \text{ mol}}}$$

Step 3: mass (specific)

$$1.1667 \text{ mol} \times \frac{114.2 \text{ g C}_8\text{H}_{18}}{1 \text{ mol C}_8\text{H}_{18}} = \boxed{130 \text{ g C}_8\text{H}_{18}}$$

Worksheet #1-5