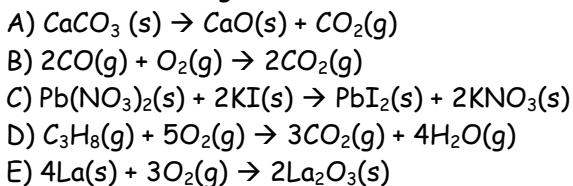
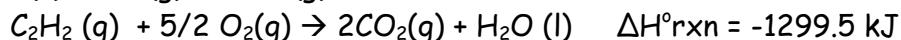
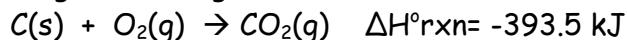
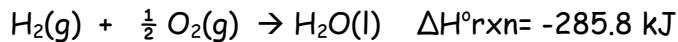


Day # \_\_\_\_\_ Topic: \_\_\_\_\_ Chapter: \_\_\_\_\_

1. Of the following reactions which involves the largest decrease in entropy?



2. Given the following thermochemical equations



Calculate  $\Delta H$  for the decomposition of one mole of  $\text{C}_2\text{H}_2$  to its elements.

### **$\Delta G$ Calculations with Equilibrium & Phase Changes**

$$\Delta G^\circ = \Sigma \Delta G^\circ(\text{products}) - \Sigma G^\circ(\text{reactants})$$

$$\text{GRAND Daddy: } \Delta G = \Delta H - T\Delta S$$

$$\Delta G = \Delta G^\circ + RT \ln Q$$

At Equilibrium:  $\Delta G = 0$  and  $Q = K$ , thus we get the following at equilibrium...

$$\Delta G^\circ = -RT \ln K$$

#### **Predicting Spontaneity**

$\Delta H$	$T\Delta S$	$\Delta G$	Spontaneity

1. For the following reaction predict the signs of  $\Delta S^\circ_{\text{rxn}}$  &  $\Delta H^\circ_{\text{rxn}}$ . Using your sheets of values from appendix C what is the  $\Delta S^\circ_{\text{rxn}}$ ;  $\Delta H^\circ_{\text{rxn}}$  and then the  $\Delta G_{\text{rxn}}$  for the following at  $35^\circ\text{C}$ ? (cannot use Products-Reactants for  $\Delta G_{\text{rxn}}$ )



2. Calculate  $\Delta G^\circ$  for the ionization of hydrofluoric acid at  $25^\circ\text{C}$  ( $K_a = 6.0 \times 10^{-4}$ )

3. The following reaction is nonspontaneous under standard state conditions at room temperature. (What then are the possible choices for signs of  $\Delta H^\circ$  &  $\Delta S^\circ$ )



To make it a spontaneous reaction would you raise or lower the temperature? What temperature? Explain.

4. The heat of fusion of benzene is 9.84 KJ/mol; its freezing point is  $5^\circ\text{C}$ .

- a. Calculate for  $\Delta S^\circ$  the reaction  $\text{C}_6\text{H}_6(\text{s}) \rightarrow \text{C}_6\text{H}_6(\text{l})$

- b. Now that you have the  $\Delta S^\circ$ , what is the standard molar entropy ( $S^\circ$ ) of  $\text{C}_6\text{H}_6(\text{s})$  taking  $S^\circ \text{C}_6\text{H}_6(\text{l}) = 173.3 \text{ J/mol} \cdot \text{K}$