Name: _____ **Date: _____**

Gibbs Free Energy Practice Problems

*°C = (°F – 32) * 5/9* *°F = °C * 9/5 + 32* *K = °C + 273*

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1. Calculate the Gibbs free energy change (ΔG) for the following chemical reaction:

   $ATP \longrightarrow ADP + P_i$

   The reaction occurs at 68 °F, the change in heat (ΔH) = 19,070 cal, and the change in entropy (ΔS) = 90 cal/K.

2. Calculate the Gibbs free energy change (ΔG) for the following chemical reaction:

   $glutamate + NH_3 \longrightarrow glutamine + H_2O$

   The reaction occurs at 68 °F, the change in heat (ΔH) = 4103 cal, and the change in entropy (ΔS) = 2.4 cal/K.

3. Would either of the reactions above occur spontaneously? If so, which one(s) and why?

4. Are either of the above reactions endergonic? If so, which one(s) and why?

5. How does the Gibbs free energy in each of the two reactions change if the temperature were raised to normal body temperature (98.6 °F)?

6. Does an increase in reaction temperature make each of these reactions more or less likely to occur spontaneously? Explain your answer.