Review for Thermochemistry Test

1. Enthalpy
    a. Definition:
    b. Symbol:
    c. Units:
    d. Formula for calculating the enthalpy change of a reaction:
    e. An enthalpy change is favorable when:
2. Entropy
    a. Definition:
    b. Symbol:
    c. Units:
    d. Formula for calculating the entropy change of a reaction:
    e. An entropy change is favorable when:
3. Gibbs Free Energy
    a. Definition:
    b. Symbol:
    c. Units:
    d. Write both formulas (remember, they will both give you the same answer when solving problems) for calculating the Gibbs free energy change of a reaction:
    e. A reaction is spontaneous if the sign of the free energy change is_____. It is nonspontaneous if the sign of the free energy change is _____.
4. What are the standard conditions of temperature and pressure for thermochemistry problems? _____ and _____
5. What does “favorable” mean? What does “spontaneous” mean?
6. What is a combustion reaction?
7. Write the balanced equation for the complete combustion of butane, C_4H_{10}. All reactants and products are gases. The reaction takes place at standard conditions.
8. Calculate the enthalpy change for the reaction in #7. Is it a favorable enthalpy change?
9. Calculate the entropy change for the reaction in #7. Is it a favorable entropy change?
10. Calculate the free energy change for the reaction in #7. Is it a spontaneous reaction?
11. Write the balanced equation for the photosynthesis of glucose. Glucose is $C_6H_{12}O_6$ (s). The other product is diatomic oxygen gas. The reactants are water vapor and carbon dioxide gas. The reaction takes place at standard conditions.
12. Calculate the enthalpy change for the reaction in #11. Is it a favorable enthalpy change?
13. Calculate the entropy change for the reaction in #11. Is it a favorable entropy change?
14. Calculate the free energy change for the reaction in #11. Is it a spontaneous reaction?