Answer EITHER Question 7 below OR Question 8 printed on page 13. Only one of these two questions will be graded. If you start both questions, be sure to cross out the question you do not want graded. The Section II score weighting for the question you choose is 15 percent.

$$N_2(g) + 2\,H_2(g) \rightleftarrows N_2H_4(g) \quad \Delta H^\circ_{298} = +95.4 \text{ kJ mol}^{-1};\ \Delta S^\circ_{298} = -176 \text{ J K}^{-1} \text{ mol}^{-1}$$

7. Answer the following questions about the reaction represented above using principles of thermodynamics .

   (a) On the basis of the thermodynamic data given above, compare the sum of the bond strengths of the reactants to the sum of the bond strengths of the product. Justify your answer.

   (b) Does the entropy change of the reaction favor the reactants or the product? Justify your answer.

   (c) For the reaction under the conditions specified, which is favored, the reactants or the product? Justify your answer.

   (d) Explain how to determine the value of the equilibrium constant, K_{eq}, for the reaction. (Do not do any calculations.)

   (e) Predict whether the value of K_{eq} for the reaction is greater than 1, equal to 1, or less than 1. Justify your answer.