**Problem Set #6 Maximizing Yield**

1. N2O4 (g) + 59 KJ ⇄ 2 NO2 (g)

(a) Describe four ways of increasing the *yield* of for the reaction above.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iv) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b) Describe three ways to increase the *rate* of the above reaction.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. 2 SO3 (g) ⇄ 2 SO2 (g) + O2 (g) + 215 KJ

(a) Describe four ways of increasing the yield of for the reaction above.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(iii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iv) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b) Describe three ways to increase the rate of the above reaction.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.  H2O (g)  ⇄ H2O (l)  ΔH = -150 KJ

(a) Describe three ways of increasing the *yield* of for the reaction above.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iii) \_\_\_\_\_ \_\_

(b) Describe three ways to increase the *rate* of the above reaction.

(i) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (iii) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. In the Haber reaction:

3 H2 (g) + N2 (g) ⇌ 2 NH3 (g) + energy

Explain why each condition is used in the process to make ammonia.

A high pressure of 200 atm

The presence of Fe2O3 (s)

A relatively high temperature 500 oC