Friday Worksheet **Name: ……..**

Chemical equilibrium worksheet 4

1) Consider the equilibrium expression on the right. All species are in the gaseous state.

$$K = \frac{[A]^2[B]^3}{[C]^5\,[D]}$$

a) Write the chemical equation for the reverse reaction.

b) Write the chemical equation whose equilibrium expression is given on the right

	$\frac{1}{K}$
	$K^{1/2}$
	K^2

2) Hydrogen and fluorine react according to the equation below.

$$H_2(g) + F_2(g) \Leftrightarrow 2HF(g) \quad \Delta H = -542 \text{ kJ mol}^{-}$$

In an experiment 0.300 mol of hydrogen and 0.440 mol of fluorine were placed in a reaction vessel of volume V litres. Once equilibrium was established there was 0.320 mol of HF present in the reaction vessel. Calculate the equilibrium expression for this reaction.

3) Nitrogen and hydrogen react to produce ammonia according to the equation below.

$$N_{2(g)} + 3H_{2(g)} \rightleftarrows 2NH_{3(g)} \quad \Delta H = -92 \text{ kJ mol}^{-}$$

An amount of 2.00 mol of ammonia was placed in a sealed vessel a t a constant temperature and allowed to reach equilibrium.

a) Explain why the rate of the reaction $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$ will never be greater than the rate of the reaction $2NH_{3(g)} \rightarrow N_{2(g)} + 3H_{2(g)}$

i. as the system approaches equilibrium.

ii. once equilibrium is established.

b) Sketch, on the axes provided below, a fully labelled energy profile diagram for the decomposition reaction of NH_3. Indicate on the diagram the effect of using a catalyst in this reaction