Chemistry 146 – Van Bramer
Spring Problem Set – Week 5

The equilibrium for the following chemical reaction is very temperature dependent.

$$2\ NO_2 \text{ <--> } N_2O_4$$

1. Write the equilibrium expression for this reaction.

2. Calculate the equilibrium constant given the equilibrium conditions at 320 K where:
   a. $P_{NO2} = 0.10$ atm
   b. $P_{N2O4} = 0.018$ atm

3. Given the following initial conditions, predict the direction of the reaction.

NO_2 (atm)	**N_2O_4 (atm)**
0.10	0.10
0.010	0.010
1.0	2.0
2.0	7.0
0.01	1.8*10-4
0.5	0.5

4. Given the initial, non-equilibrium, conditions. Calculate the equilibrium pressure of NO_2 and N_2O_4.
   a. $P_{NO2} = 0.20$ atm; $P_{N2O4} = 0.00$ atm
   b. $P_{NO2} = 0.00$ atm; $P_{N2O4} = 0.20$ atm
   c. $P_{NO2} = 0.20$ atm; $P_{N2O4} = 0.20$ atm