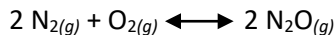


Unit 7 – Chapter 13 Assignment #1

Name \_\_\_\_\_

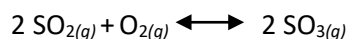
Period \_\_\_\_\_

- 1) At a particular temperature a 2.00-L flask at equilibrium contains  $2.89 \times 10^{-4}$  mol  $N_2$ ,  $2.50 \times 10^{-5}$  mol  $O_2$ , and  $2.00 \times 10^{-2}$  mol  $N_2O$ . Calculate  $K$  at this temperature for the reaction



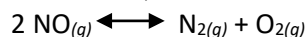
If  $[N_2] = 2.00 \times 10^{-4} M$ ,  $[N_2O] = 0.200 M$ , and  $[O_2] = 0.00245 M$ , does this represent a system at equilibrium?

- 2) At 1100 K,  $K_p = 0.25$  for the reaction



What is the value of  $K$  at this temperature?

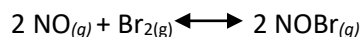
- 3) The equilibrium constant,  $K_p$ , is  $2.4 \times 10^3$  at a certain temperature for the reaction



For which of the following sets of conditions is the system at equilibrium? For those that are not at equilibrium, in which direction will the system shift?

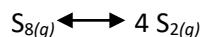
- $P_{NO} = 0.010$  atm,  $P_{N_2} = 0.11$  atm,  $P_{O_2} = 2.0$  atm
- $P_{NO} = 0.0078$  atm,  $P_{N_2} = 0.36$  atm,  $P_{O_2} = 0.67$  atm
- $P_{NO} = 0.0062$  atm,  $P_{N_2} = 0.51$  atm,  $P_{O_2} = 0.18$  atm

- 4) The reaction



has  $K_p = 109$  at  $25^\circ C$ . If the equilibrium partial pressure of  $Br_2$  is 0.0159 atm and the equilibrium partial pressure of  $NOBr$  is 0.0768 atm, calculate the partial pressure of  $NO$  at equilibrium.

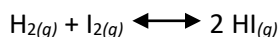
- 5) A sample of  $S_{8(g)}$  is placed in an otherwise empty rigid container at 1325 K at an initial pressure of 1.00 atm, where it decomposes to  $S_{2(g)}$  by the reaction



At equilibrium, the partial pressure of  $S_8$  is 0.25 atm. Calculate the  $K_p$  for this reaction at 1325 K.

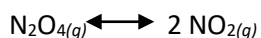
- 6) Nitrogen gas ( $N_2$ ) reacts with hydrogen gas ( $H_2$ ) to form ammonia ( $NH_3$ ). At  $200^\circ C$  in a closed container, 1.00 atm of nitrogen gas is mixed with 2.00 atm of hydrogen gas. At equilibrium, the total pressure is 2.00 atm. Calculate the partial pressure of hydrogen gas at equilibrium.

- 7) At a particular temperature,  $K = 1.00 \times 10^2$  for the reaction



In an experiment, 1.00 mol  $H_2$ , 1.00 mol  $I_2$ , and 1.00 mol HI are introduced into a 1.00-L container. Calculate the concentrations of all species when equilibrium is reached.

- 8) At a particular temperature,  $K = 4.0 \times 10^{-7}$  for the reaction



In an experiment, 1.0 mol  $N_2O_4$  is placed in a 10.0-L vessel. Calculate the concentrations of  $N_2O_4$  and  $NO_2$  when this reaction reaches equilibrium.

- 9) Lexan is a plastic used to make compact discs, eyeglass lenses, and bullet-proof glass. One of the compounds used to make Lexan is phosgene ( $COCl_2$ ), an extremely poisonous gas. Phosgene decomposes by the reaction



For which  $K_p = 6.8 \times 10^{-9}$  at  $100^\circ C$ . If pure phosgene at an initial pressure of 1.0 atm decomposes, calculate the equilibrium pressures of all species.