1. Suppose that K_1 and K_2 are respective equilibrium constants for the two reactions
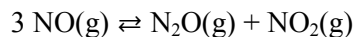
$$XeF_6(g) + H_2O(g) \rightleftarrows XeOF_4(g) + 2\ HF(g)$$
$$XeO_4(g) + XeF_6(g) \rightleftarrows XeOF_4(g) + XeO_3F_2(g)$$
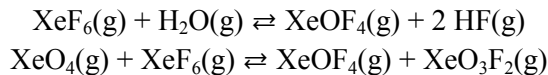
Give the equilibrium constant for the reaction

$$XeO_4(g) + 2\ HF\ (g) \rightleftarrows XeO_3F_2(g) + H_2O(g)$$
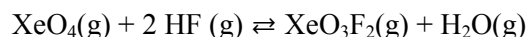
In terms of K_1 and K_2.

2. Explain the effect of each of the following stresses on the position of the following equilibrium:

$$3\ NO(g) \rightleftarrows N_2O(g) + NO_2(g)$$

The reaction as written is exothermic.
   a) $N_2O(g)$ is added to the equilibrium mixture without change of volume or temperature.

   b) The volume of the equilibrium mixture is reduced at constant temperature.

   c) The equilibrium mixture is cooled.

d) Gaseous argon is added to the equilibrium mixture without changing the volume.

3. At 25 ºC, the equilibrium constant for the reaction

$$N_2(g) + O_2(g) \rightleftarrows 2\ NO(g)$$
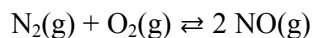
is 4.2×10^{-31}. Suppose a container is filled with nitrogen (at an initial partial pressure of 0.41 atm), oxygen (at an initial partial pressure of 0.59 atm), and nitrogen oxide (at an initial partial pressure of 0.22 atm). Calculate the partial pressures of all three gases after equilibrium is reached at this temperature.