1. Consider the following reaction at equilibrium:

\[ 2 \text{N}_2(g) + 5 \text{O}_2(g) \rightleftharpoons 2 \text{N}_2\text{O}_5(g) \quad \Delta H = +450 \text{ kJ} \]

A) If additional \( \text{N}_2\text{O}_5 \) were added to the system, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

B) If helium gas were added to the system, doubling the total pressure in the system, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

C) If the volume of the system were cut in half, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

D) If \( \text{O}_2 \) were removed from the system by a reaction with another material, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

E) If additional \( \text{N}_2 \) were added to the system, would \( K_{eq} \) INCREASE, DECREASE, or remain UNCHANGED?

F) If the temperature of the system were increased, would the reaction shift RIGHT, shift LEFT or remain UNCHANGED?

G) If the temperature of the system were decreased, would \( K_{eq} \) INCREASE, DECREASE, or remain UNCHANGED?

2. A mixture of 0.200 mol NO and 0.200 mol CO\(_2\) is placed in a 1.00 L flask and allowed to reach equilibrium at a given temperature. Analysis of the equilibrium mixture indicates that 0.067 mol of CO is present. Calculate \( K_c \) for the reaction.

\[ \text{NO}(g) + \text{CO}_2(g) \rightleftharpoons \text{NO}_2(g) + \text{CO}(g) \]

B. For the reaction above (after it has reached equilibrium), 0.10 moles of CO was injected into the reaction flask. What will be the concentrations of all reactants and products when a new equilibrium is established?