A First Course on Kinetics and Reaction Engineering
Activity 4.1 Handout C

Consider reaction (1) below and assume it to be completely irreversible.

$$2 \text{ NO}_2 + 1/2 \text{ O}_2 \rightarrow \text{N}_2\text{O}_5 \tag{1}$$

Suppose you started with a mixture that contained 5 moles of NO_2 and 2 moles of O_2. Create a mole table for the system using the reaction as it is written above, and use it to answer the following questions.

1. What is the smallest possible value for the extent of reaction?
2. What is the largest possible value for the extent of reaction?
3. What is the smallest possible value for the fractional conversion of NO_2?
4. What is the largest possible value for the fractional conversion of NO_2?
5. What is the smallest possible value for the fractional conversion of O_2?
6. What is the largest possible value for the fractional conversion of O_2?
7. If the rate of formation of N_2O_5 is 0.05 mol min^{-1} ft^3, what is the generalized rate of reaction (1)?
8. If the rate of formation of N_2O_5 is 0.05 mol min^{-1} ft^3, what is the rate of reaction (1) with respect to NO_2?
9. If the rate of formation of N_2O_5 is 0.05 mol min^{-1} ft^3, what is the rate of reaction (1) with respect to O_2?