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

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

 $8 \ NO_2 + 2 \ O_2 \rightarrow 4 \ N_2O_5$

(1)

Suppose you started with a mixture that contained 5 moles of NO₂ and 2 moles of O₂. 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 NO₂?
- 4. What is the largest possible value for the fractional conversion of NO₂?
- 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 O₂?
- 7. If the rate of formation of N_2O_5 is 0.05 mol min⁻¹ ft³, what is the generalized rate of reaction (1)?
- 8. If the rate of formation of N_2O_5 is 0.05 mol min⁻¹ ft³, 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 ft³, what is the rate of reaction (1) with respect to O_2 ?