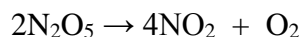


**Week 4****Chem 112 Recitation Exercises****Integrated Rate Laws**

1. The decomposition of  $\text{N}_2\text{O}_5$  in  $\text{CCl}_4$  solution is a first order reaction and  $k = 6.32 \times 10^{-4} \text{ s}^{-1}$ .



a. How much  $\text{N}_2\text{O}_5$  remains in solution after 1.00 hour if the initial concentration of  $\text{N}_2\text{O}_5$  was 0.500 M?

b. What percent of  $\text{N}_2\text{O}_5$  has reacted at that point?

c. At what time will 25% of  $\text{N}_2\text{O}_5$  remain?

**Le Chatelier's principle**

2. Consider the reaction,  $\text{CO}(\text{g}) + 2\text{H}_2(\text{g}) \rightleftharpoons \text{CH}_3\text{OH}(\text{g})$   $\Delta\text{H} = -91 \text{ kJ}$ , which is at equilibrium. Predict the effect of each of the following changes on the equilibrium and explain your reasoning.

a. Some  $\text{CH}_3\text{OH}(\text{g})$  is removed at constant volume.

b. Some  $\text{CO}(\text{g})$  is added at constant volume.

c. The system is compressed to a smaller volume.

d. Some  $\text{N}_2(\text{g})$  is added at constant volume.

e. A catalyst is added.

f. The temperature is increased.