

## Unit 13 – Chapter 12: Kinetics

### Problem #33

The rate of the reaction:  $\text{NO}_{2(g)} + \text{CO}_{(g)} \rightarrow \text{NO}_{(g)} + \text{CO}_{2(g)}$  depends only on the concentration of nitrogen dioxide below 225°C. At a temperature below 225°C, the following data were collected:

Time (s)	[NO <sub>2</sub> ] (mol/L)
0	0.500
1.20 × 10 <sup>3</sup>	0.444
3.00 × 10 <sup>3</sup>	0.381
4.50 × 10 <sup>3</sup>	0.341
9.00 × 10 <sup>3</sup>	0.250
1.80 × 10 <sup>4</sup>	0.174

Determine the rate law, the integrated rate law, and the value of the rate constant. Calculate [NO<sub>2</sub>] at 2.70 × 10<sup>4</sup> s after the start of the reaction.