Name(s): _____

Post lab Questions

1. The following initial rate data was collected for the reaction of hydrogen iodide with ethyl iodide: HI(g) + C₂H₅I(g) \rightarrow C₂H₆(g) + I₂(g)

[HI]	[C2H5I]	Initial Rate (mol/L · s)
0.015	0.900	4.01 x 10 ⁻⁵
0.030	0.900	8.04 x 10 ⁻⁵
0.030	0.450	3.99 x 10 ⁻⁵

From the data, determine the rate law and the value of the rate constant.

2. You are assigned to a team that is conducting research on the decomposition of a protein in the presence of an oxidizing agent while in aqueous solution. As the kinetics expert on the team, your job is to determine the rate law for the reaction. You have available a spectrophotometer that can measure the concentration of the protein at any concentration above a minimum of 0.1 mM. Describe the experiments you will perform.

3. Consider the following plot:





This plot shows a first order decay with an initial concentration of 0.0100 M.

Estimate the initial rate.	
Estimate the rate constant.	
Estimate the half-lije from the rate constant.	
Is the estimated half-life consistent with the plotted data?	

4. The civilization on the planet Ecton is endangered by the continual illegal disposal of Klingon hair spray which is causing the atmosphere to decompose by a first-order rate law. Science Officer Spock has determined that their atmosphere is decomposing with a half-life of 12.50 min⁻¹. Dr. McCoy, the medical officer, has determined that the Ectonians need a minimum of 6.25% of the original atmosphere to survive. Meanwhile, Scottie, the chief engineer, is desperately trying to fix the transporter so that the entire Ectonian population can be transported to a safe planet. You are the acting Commander, replacing Captain Kirk, who is on vacation. How long does Scottie have to repair the transporter?