1) Hydrogen peroxide decomposes to water and oxygen by the following reaction:
$$H_2O_2 \rightarrow H_2O + O_2$$

At 40^0C, the following data was taken for initial rates of reactions:

[H_2O_2] (moles/liter)	Initial Rate (M/min)
0.1000	1.93×10^{-4}
0.2000	3.86×10^{-4}
0.3000	5.79×10^{-4}

a, What is the order of the reaction?
b. Write the rate law.
c. Calculate the rate constant.
d. Calculate the half-life for the reaction.

2) Hydrogen peroxide is sold commercially at a 30.0% solution. If the solution is kept at 40^0C, how long will it take for the solution to become 10.0% H_2O_2? (Use the reaction order from problem #1)

3) The decomposition of HI to H_2 and I_2 is second order. Its half-life is 85 seconds when the initial concentration is 0.15 M.
a. What is k for the reaction?
b. How long will it take to go from 0.300 M to 0.100 M?

4) Consider the data presented from the following reaction: $A_{(g)} \rightarrow B_{(g)}$

Time (seconds)	[A] (moles/liter)
0	0.100
40	0.067
80	0.045
120	0.030
160	0.020

a) Determine if the reaction is of the 1st order or 2nd order using the appropriate data and graphs
b) What is the value of the rate constant?
c) What is the half-life of the reaction?

5) Element decomposition is of the 1st order. Americanium-241 is used in smoke detectors. It has a rate constant for radioactive decay of $k = 1.6 \times 10^{-3}$ yr^{-1}. By contrast, iodine-125, which is used to test for thyroid functioning, has a rate constant for radioactive decay of $k = 0.011$ day^{-1}.
      a. What are the half-lives of these two isotopes?
      b. Which one decays at a faster rate?
      c. How much of a 1.00 mg sample of each isotope remains after three half-lives?

6) A first-order reaction is 75% complete at 320 seconds.
      a. What are the first and second half-lives in 320 seconds.
      b. How long does it take for 90% completion?