**Quiz 6**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Is today’s experiment a qualitative or quantitative experiment (2 points)? \_\_answers will vary
2. The figure shows a plot of ln(k) vs. 1/T for two reactions with different activation energies. Which reaction has a higher activation energy (3 points)?

Reaction 2

1. This reaction was monitored as a function of time:

AB → A + B

A plot of 1/[AB] versus time yields a straight line with a slope of +0.055 /M∙s (15 points).

* 1. What is the value of the rate constant (k) for this reaction this temperature?

k = 0.055 /M∙s

* 1. Write the rate law for the reaction.

rate = k[AB]2

* 1. What is the half-life when the initial concentration is 0.55 M?

$$t\_{1/2}=\frac{1}{k[AB]\_{o}}=\frac{1}{\left(0.055\frac{1}{M s}\right)(0.55 M)}=33.05785124 s≈33 s$$

* 1. If the initial concentration of AB is 0.250 M and the reaction mixture initially contains no products, what are the concentration of A and B after 75 s?

$$\frac{1}{[AB]}=kt+\frac{1}{[AB]\_{o}}$$

$$\frac{1}{[AB]}=\left(0.055\frac{1}{M s}\right)(75 s)+\frac{1}{0.250 M}$$

$$\frac{1}{[AB]}=4.125\frac{1}{M}+4.00\frac{1}{M}=8.125\frac{1}{M}$$

$$\left[AB\right]=\frac{1}{8.125\frac{1}{M}}=0.123076923 M$$

$$∆\left[AB\right]=[AB]\_{0 s}-[AB]\_{75 s}=0.250 M-0.123076923 M=0.126923076 M$$

[A$]\_{75 s}=0.126923076 \frac{mol AB}{L}×\frac{1 mol A}{1 mol AB}=0.13 M A$

[B$]\_{75 s}=0.126923076 \frac{mol AB}{L}×\frac{1 mol B}{1 mol AB}=0.13 M B$