This is BCE#32.

I recommend you print out this page and bring it to class. Click here to show a set of five BCE32 student responses randomly selected from all of the student responses thus far in a new window.

John , here are your responses to the BCE and the Expert's response.

1. List four factors (no particular order) that effect the rate/speed of a chemical reaction (what can increase or decrease the speed of a reaction?)

Factor #1 concentration

Temperature. Changing the temperature of a reaction will change the speed of the reaction.

Factor #2 temperature

Concentration. The rate of a reaction increases with increasing concentration of reactants (pressure changes behave in the same way as concentration) (demonstration of the addition of zinc to 1 M HCl and 6 M HCl)

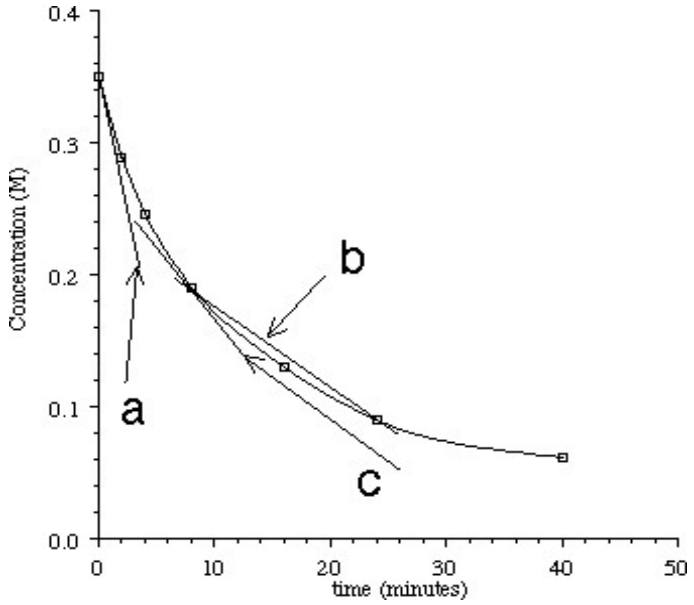
Factor #3 catalyst

Catalyst. The rate of a reaction increases with addition of a catalyst.

Factor #4 surface area

Surface area. The rate of a reaction increases with increased surface area of the reactant.

2. In the plot below the concentration of a reactant for a reaction has been followed over time. There are three straight lines drawn (two tangent and one not tangent) on the curve. Label the line that represents the initial rate, an instantaneous rate and an average rate.



the initial rate straight line is line acidic 91%

The slope of line a is called the initial rate. It is the rate of the reaction at the instant the reaction begins. The initial rate is the fastest rate of the reaction. The initial rate is the line tangent to the curve at time = 0.

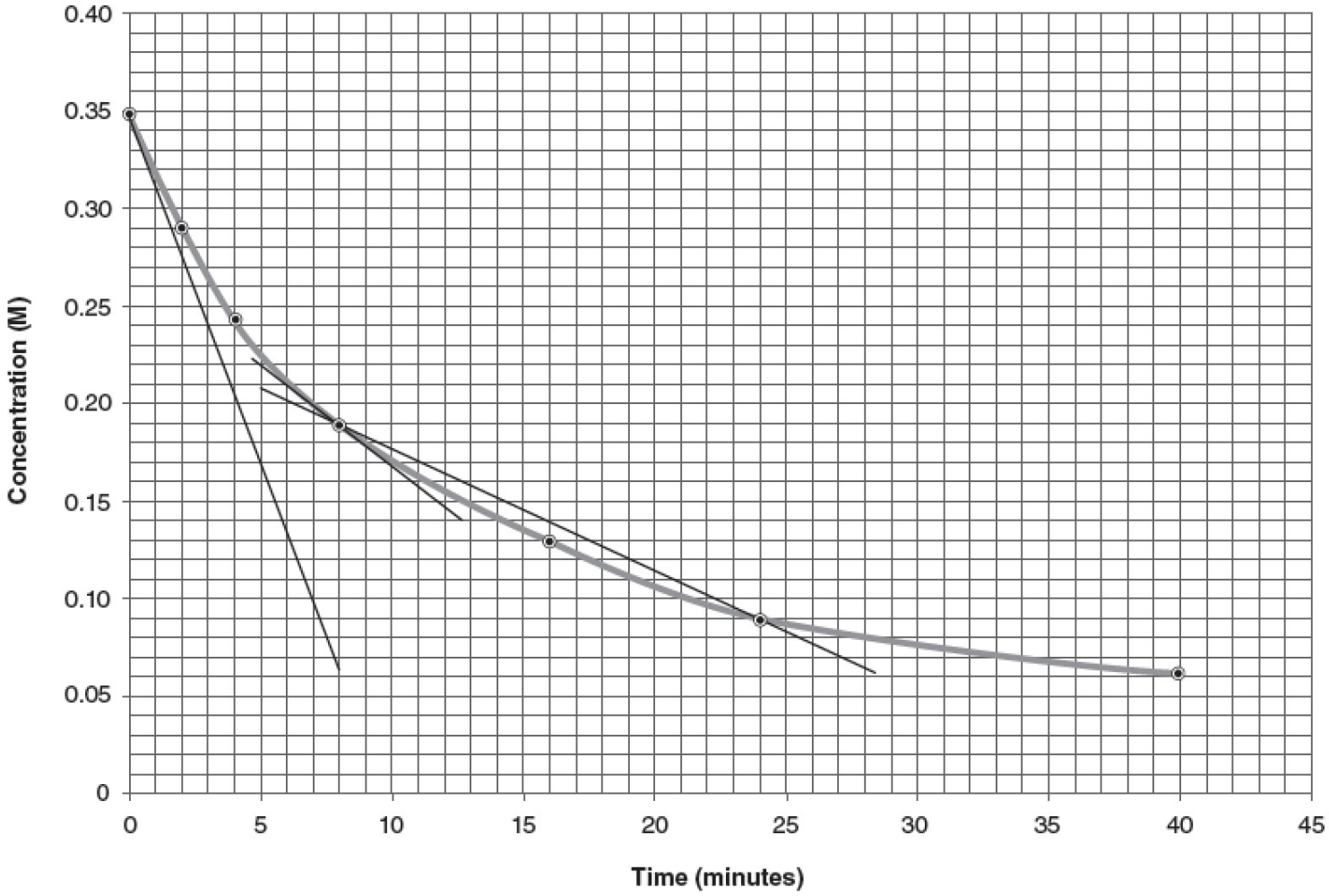
an instantaneous rate straight line is c 82%

The slope of line c is an instantaneous rate, since the line is tangent to the curve at a single point during the reaction.

an average rate straight line is line b 82%

The average rate is line b, the slope of the line through any two data points is called the average rate.

3. The slope of a straight line can be determined by dividing the difference in the y-values of two points on the line by the difference in the x-values of the same two points on the line. Look at the Figure on page 3 of the DCI Workbook (shown here)

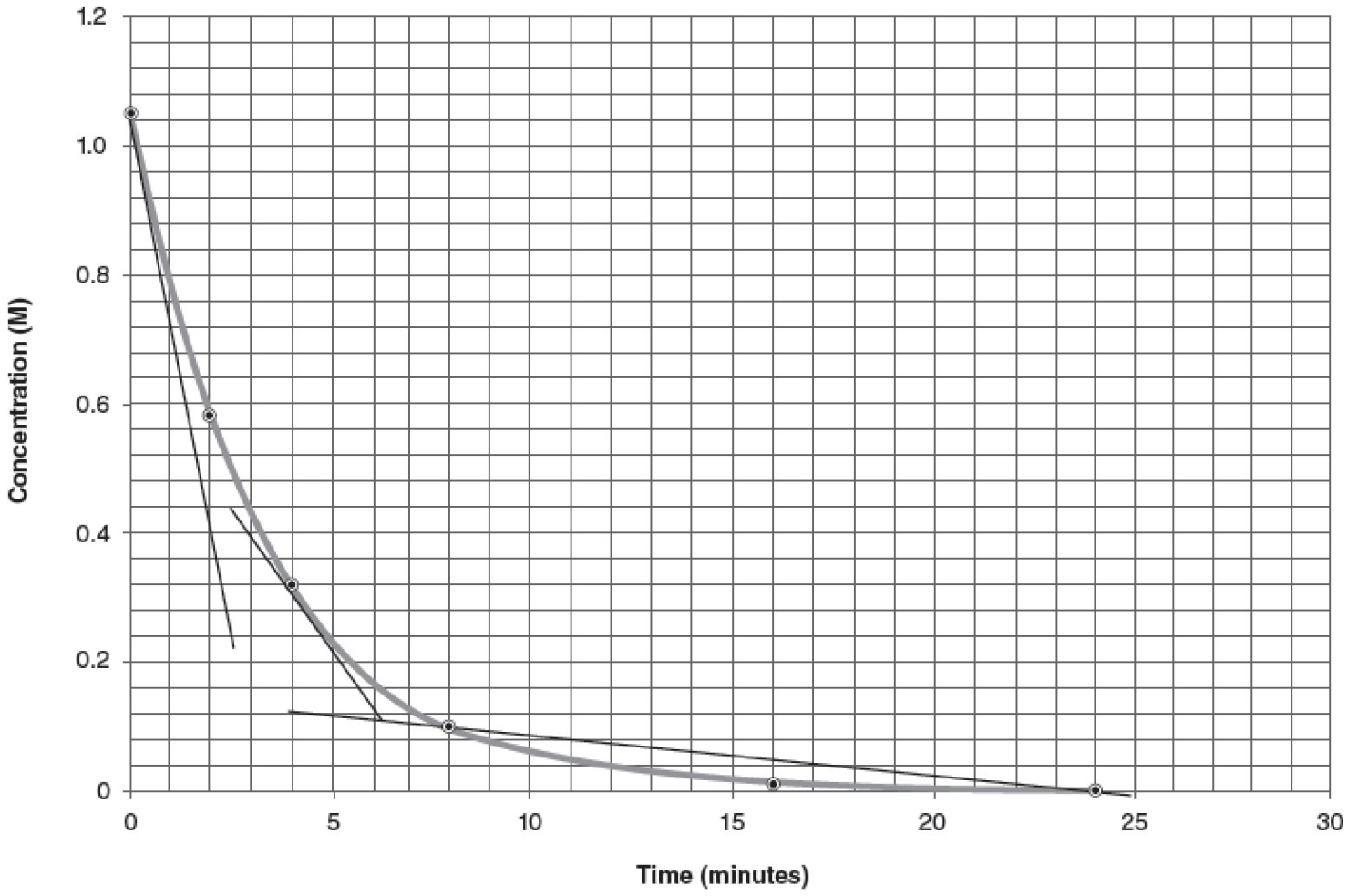


and determine the slope of the line (the initial rate) that passes through 0.35 M on the y-axis. (NOTE: I recommend choosing two points on the straight line, counting the number of squares for the y-axis distance and the x-axis distance and then dividing the values.)

slope of the line 0.036 M minute $^{-1}$ 64%

The slope of line (initial rate) is -0.037 M minute $^{-1}$. The rate is decreasing so the slope is negative.

4. Look at the Figure on page 4 of the DCI Workbook (shown here)



and determine the slope of the line (the initial rate) that passes through 1.05 M on the y-axis. (NOTE: I recommend choosing two points on the straight line, counting the number of squares for the y-axis distance and the x-axis distance and then dividing the values.)

slope of the line 0.315 M minute $^{-1}$ 64%

The slope of line (initial rate) is -0.315 M minute $^{-1}$. The rate is decreasing so the slope is negative.

5. By what factor did the initial concentrations change for Experiments #1 (Table on page 3) and #2 (Table on page 3)? (Take a ratio of $[NO_2]_o$ (Exp #2)/$[NO_2]_o$ (Exp #1).)

3

The ratio of the concentrations is 1.05 M/0.350 M = 3 45%

6. By what factor did the initial rates change for Experiments #1 (Q 3) and #2 (Q 4)? (Take a ratio of intial rate of (Exp #2)/intial rate of (Exp #1).)

~9 27%

The ratio of the initial rates is -0.315 M minute $^{-1}$/-0.037 M minute $^{-1}$ = 8.51 or 9.

7. Is there anything about the questions that you feel you do not understand? List your concerns/questions.

nothing

8. If there is one question you would like to have answered in lecture, what would that question be?

nothing