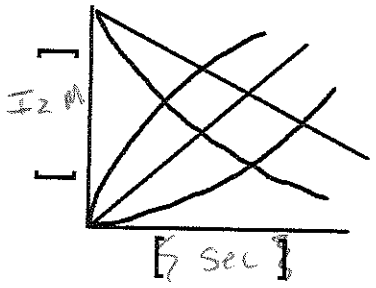
Initial Rate

1. If you are going to graph how fast the following reaction is proceeding. I is clear and colorless and I_2 is brown. The concentration of I at the beginning of the reaction is 0.5M

$$I + I \Rightarrow I_2$$

a. Below you will find a graph, please add in the X and Y units you would like to use and circle the line representing how the I_2 is changing/ Can not track I because it is clear



b. From this graph, how would you physically find the rate?
Slope of graph at Point

c. What changes on a molecular level that might cause a change in the rate?
less I to collide

d. What is the rate of disappearance of I at the start of the chemical reaction relative to the I_2?
I is 2X the appearance of I_2

e. What is the order of the reaction relative to I?
Second

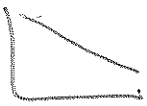
f. What is the rate law for this reaction?
$Rate = K[I]^2$

2. A candle burns with a mass of 75 grams burns for 5 min and has a mass of 72.5 grams.

a. What is the rate of burning in grams/second? $5 \times 60 = 300$ $75/300 =$

b. Over the course of time a candle (speeds up/slows down/ remains constant) as it burns.

c. How would the graph look different from the graph in #1?
straight



d. What is the overall order of the process?
Zero

e. Student hypothesis: The rate constant equals the rate and this will always be the case for all reactions. Justify/nullify. NO, only for zero order process

3. In this particular reaction the rate is being measured by a gas pressure meter. The hydrogen is being evolved is 0.45 mol/second. What is the rate of consumption of the PH_3.

$$4PH_{3(s)} \rightarrow P_{4(s)} + 6H_{2(g)}$$

$$0.45 \cdot \frac{4}{6} = 0.3 \frac{mol}{s}$$