

**Practice quiz 10: Concentrations vs. Time**

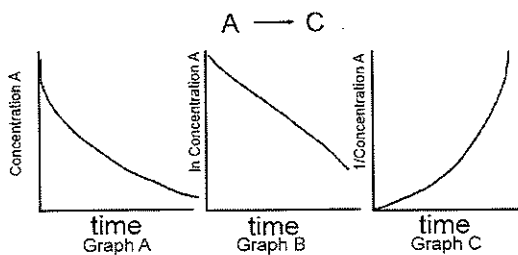
Proficient = 7/10



The reaction listed is a first order reaction. Half of the material undergoes the reaction in 20 seconds. Answer the following questions. The mass in these problems is in a form that has a concentration.

1. (#5-5) 40g of A is reacting, how much chemical will be left after 40 sec?
  - a. 0M
  - b. 5g
  - c. 10g
  - d. 20g

*40 → 20 → 10*
2. (#5-5) The amount of A is 40 but the temperature is warmed.. Which of the following is true?
  - I. Activation energy will be reduced causing a faster reaction *No*
  - II. The half life will now be reduced *yes - Faster - Temp depend*
  - a. I only
  - b. II only
  - c. I and III only
  - d. I, II, and III
3. (#5-5) The amount of A is doubled from 40g to 80g. Which of the following is true?
  - I. The initial rate will increase. *Yes*
  - II. The half life will reduce due to a larger starting quantity. *No - Temp depend*
  - a. I only
  - b. II only
  - c. Both I and II
  - d. Neither I or II



4. (#5-5)
 

The decomposition of A is graphed and the data is displayed. Which of the following is true?

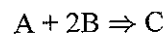
  - I. The slope of the line in graph A represents the rate of the reaction. *Yes*
  - II. The slope of the line in graph B represents the rate constant. *Yes*
  - a. I only
  - b. II only
  - c. Both I and II
  - d. Neither I or II
5. (#5-5)
 

The decomposition of A is graphed and the data is displayed. Which of the following is true?

  - I. This process is first order *Yes*
  - II. The half life of this reaction is constant. *Yes*
  - a. I only
  - b. II only
  - c. Both I and II
  - d. Neither I or II

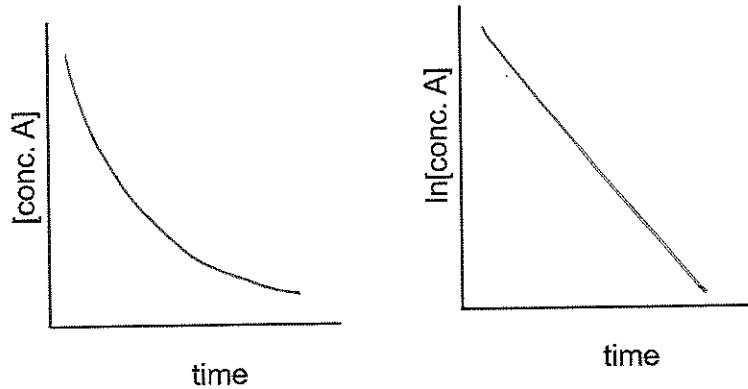
## Short Answer

6.



This reaction is 1st order with respect to A and zero order with respect to B.

- a) You gathered concentrations of [A] over time and graphed the data on two separate graphs. [ ] vs. T and  $\ln [ ]$  vs. time. Sketch these below. (#5) (#5)



- b) One of the graphs above has a slope equal to  $-0.551/\text{sec}$  which represents the rate constant. Which graph in has this slope? (#5)

B

- c. What is the time of the half life of this reaction? (#5)

$$t_{1/2} = \frac{0.693}{.551} = 1.2 \text{ seconds}$$

- d. If your sample started at 0.6M. How long would it take to react down to an [A] concentration = 0.15M? (#5)

$$.6 \xrightarrow{1.2} .3 \xrightarrow{1.2} .15$$

2.4 sec

$2 \left( \frac{1}{2} \text{ lives} \right)$