

## AP Chemistry – Reaction Rates – 53

Name \_\_\_\_\_ Per \_\_\_\_

1. A flask is charged with 0.100 mole of A and allowed to react to form B according to the hypothetical gas-phase reaction  $A_{(g)} \rightarrow B_{(g)}$ . The following data are collected:

Time (s)	0	40	80	120	160
Moles of A	0.100	0.067	0.045	0.030	0.020

(a) Calculate the number of moles of B at each time in the table.

(b) Calculate the average rate of disappearance of A for each 40 s interval, in units of moles/s.

(c) What additional information would be needed to calculate the rate in units of M/s?

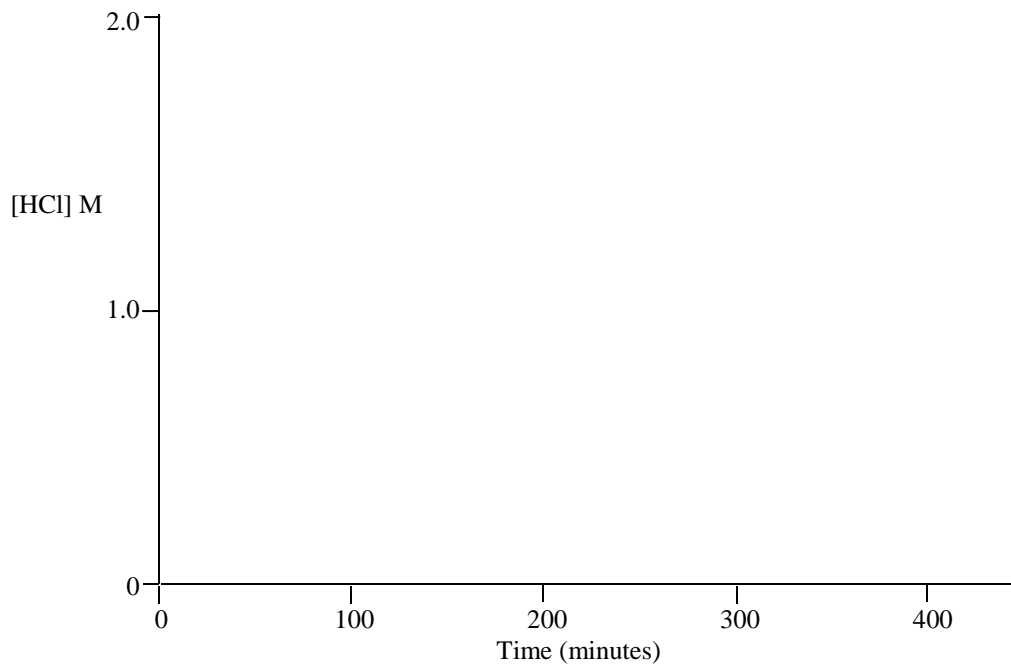
2. The rate of disappearance of HCl was measured for the following reaction:

$CH_3OH_{(aq)} + HCl \rightarrow CH_3Cl_{(aq)} + H_2O_{(l)}$ . The following data were collected:

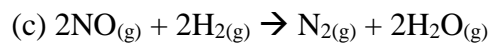
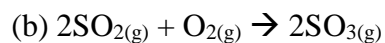
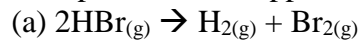
Time (min.)	0	54.0	107.0	215.0	430.0
[HCl] M	1.85	1.58	1.36	1.02	0.580

Calculate the average rate of reaction, in M/s, for the time interval between each measurement.

3. Using the data provided in question 2, graph [HCl] vs. time. Use the graph to determine the instantaneous rates in M/min and M/s at  $t=75.0$  minutes and  $t=250.0$  minutes.



4. For each of the following gas-phase reactions, write the rate expression in terms of the appearance of each product or disappearance of each reactant:



5. For the compound  $\text{C}_3\text{H}_8\text{O}_2$ , determine the mass percentage of each element.