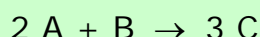


EXERCISES ON CHEMICAL KINETICS

1. Explain the influence between the following factors and the reaction rate:

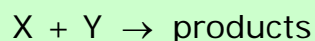
- the presence of catalysts
- the change in the concentration of reactants
- the change in temperature

2. This reaction in gaseous phase is elemental and, therefore of order 2 with respect to A and of order 1 with respect to B



- write the expression of the reaction rate
- write the units for the reaction rate and the rate constant
- explain the influence of an increase in temperature (at constant volume) on the reaction rate
- explain the influence of an increase in volume (at constant temperature) on the reaction rate

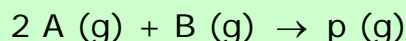
3. The rate law for the reaction



is of order 1 with respect to X and with respect to Y. When the concentration of X is 0.15 M and the concentration of Y is 0.75 M, the rate is 4.2×10^{-3} M/s. Determine

- the value of the rate constant
- the rate of the reaction when both concentrations (X and Y) are equal to 0.5 M

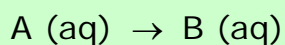
4. In a kinetic study of the reaction



the following data were obtained. Write the rate law with proper orders. Give the overall order of the reaction.

Experiment	[A]	[B]	Rate of disappearance of A (M/s)
1	0.0125 M	0.0253 M	0.0281
2	0.0250 M	0.0253 M	0.0562
3	0.0125 M	0.0506 M	0.1124

5. Consider the hypothetical aqueous reaction



A flask is charged with 0.065 mol of A in a total volume of 100 mL. The following data are collected:

Time (min)	0	10	20	30	40
Moles of A	0.065	0.051	0.042	0.036	0.031

- Calculate the number of moles at each time in the table. Assume that there are not molecules of B at time zero
- Calculate the average rate of disappearance of A for each 10-min interval, in units of mol/s
- Between $t=10$ min and $t=30$ min, what is the average rate of appearance of B in units of M/s? Assume that the volume of the solution is constant