Answer on Question #72441 – Chemistry – Other

Task:

The rate constant of a first order reaction is 6.9×10^{-3} s^{-1}. How much time will it take to reduce the initial concentration to it $1/8^{th}$ value?

Solution:

Order of reaction = first
Rate constant k = 6.9×10^{-3} s^{-1}
If initial concentration $[C]_o = x$
Then final concentration $[C] = x / 8$

Use the formula of first order reaction:

$$t = \frac{2.303}{k} * \log \frac{[C]_o}{[C]};$$

$$t = \frac{2.303}{6.9*10^{-3}} * \log \frac{x}{x/8} = 333.768 * \log(8) = 301.42\,s \approx 5\,\text{min}$$

Answer: 301.42 s = 5 min