

Answer on Question #67059 - Chemistry - Physical Chemistry

Question:

The reaction: $A \rightarrow B$ follows first-order kinetics. The time taken for 0.8 mol of A to produce 0.6 mol of B is 1 hour. What is the time taken for conversion of 0.9 mol of A to produce 0.675 mol of B?

Answer:

$$1) \quad x = \frac{n(A)_0 - n(A)_t}{n(A)_0} = \frac{n(B)_t}{n(A)_0} = 0.6/0.8 = 0.75$$

$\tau_{0.75} = 1$ hour – it is a constant for first-order reactions

$$2) \quad x = 0.675/0.9 = 0.75$$

Thus, **1 hour** is also the time taken for conversion of 0.9 mol of A to produce 0.675 mol of B.