

Quiz 14.2 – Integrated Rate Laws

Name: Key

Question 1

Radioactive decay follows 1st-order kinetics

Give the rate constant or half-life of the following radioactive elements

Element	Half-life	Rate Constant $\left(\frac{1}{s}\right)$
^{14}C	5730 y	$3.83 \cdot 10^{-12}$
^{57}Co	272 days	2.95×10^{-8}
^{99}Tc	6.0 h	$3.2 \cdot 10^{-5}$
^{218}Po	186 s	0.00373
^3H	12.3 y	$1.79 \cdot 10^{-9}$

$$t_{1/2} = \frac{\ln(2)}{k}$$

Question 2

For each order of reaction, will the half-life increase, decrease, or stay constant over the course of a reaction?

0th order – decrease

2nd order – increase

1st order – constant

Question 3

Use the data provided by email to determine the rate constant, overall reaction order, and reaction order with respect to each reactant in the reaction:



$$\text{rate} = 6.0 \frac{1}{\text{m}^2\text{s}} [\text{A}] [\text{B}]^2$$

See spreadsheet key