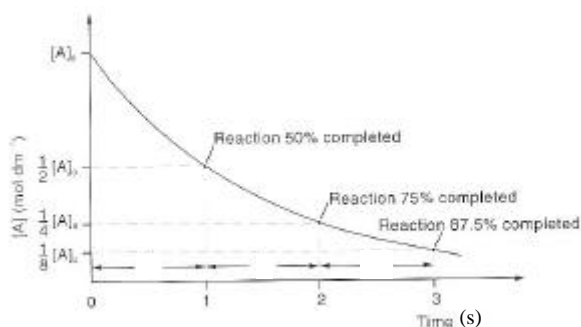


AL Chemistry
Rate Equations and Order of Reaction
Exercise 1 Order of Reaction

Name: _____ ()

Class: _____



The above figure shows the relationship between the concentration of a radioactive substance and time.

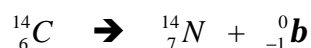
1. What is the order of reaction with respect to the concentration of this radioactive substance [A].
2. Suggest the integrated rate equation for the above radioactive decay.
3. What is the meaning of half-life?
4. Half-life $t_{\frac{1}{2}} = \frac{0.693}{k_1}$, how can we get 0.693?
5. According to the above figure, what is the half-life?

Carbon-14 is a radioactive isotope of carbon. It can be used to determinate the dates of archaeological (考古學) and geological events.

Please read page 46 and answer the following questions.

6. Where is the source of ^{14}C ?
7. By which kind of chemical compound of carbon that ^{14}C is corporated into plants.

Radioactive decay of ^{14}C is shown in the following equation.



8. What is ${}^0_{-1}\mathbf{b}$?
9. When ${}^14_6\text{C}$ is decay to ${}^14_7\text{N}$, their mass no. remain the same but the atomic no. increase by 1. **Why?** What does ${}^0_{-1}\mathbf{b}$ come from?
10. In carbon-14 dating, how can we know the original amount of ^{14}C .
11. The radioactive isotope of an element x has a half-life of 950 days and decays by first order kinetics.
 - (a) What is the rate constant of the decay reaction of x ?
 - (b) How much would a sample of 10 g of x be left after 3000 days?
12. The C-14 content from a sample of ancient wood is only 60% of that of a similar piece of modern wood. Determine the age of the ancient wood if C-14 as a half-life of 5730 years. State any **assumptions** made in the calculation.