

### Kinetics Worksheet 1

1. The rate of a chemical reaction between substances A and B is found to follow the rate equation  $\text{rate} = k[A]^2[B]$  where k is a constant. If the concentration of A is halved, what should be done to the concentration of B to make the reaction go at the same rate as before?

- (A) The concentration of B should be kept constant.
- (B) The concentration of B should be doubled.
- (C) The concentration of B should be halved.
- (D) The concentration of B should be quadrupled.

2. The rate expression for a second-order reaction could be

- (A)  $\text{rate} = k[A]$
- (B)  $\text{rate} = k[A]^2[B]$
- (C)  $\text{rate} = k[A][B]$
- (D)  $\text{rate} = k[A]^2[B]^2$

3. The half-life of  $^{14}\text{C}$  is 5570 years. How many years will it take for 90% of a sample to decompose?

- (A) 5,570 years
- (B) 17,700 years
- (C) 18,600 years
- (D) 50,100 years

4. The slowest step of a reaction is called the

- (A) elementary process.
- (B) molecularity.
- (C) order.
- (D) rate-determining step.

5. For a first-order reaction of half-life, 150 min., what is the rate constant in  $\text{min}^{-1}$ ?

- (A) 0.00104
- (B) 0.00462
- (C) 69.3
- (D) 216

6. The rate of the reaction  $2\text{NO} + \text{Cl}_2 \rightarrow 2\text{NOCl}$  is given by the rate equation

$\text{rate} = k[\text{NO}]^2[\text{Cl}_2]$ . The value of the rate constant can be increased by:

- (A) increasing the concentration of NO.
- (B) increasing the concentration of  $\text{Cl}_2$ .
- (C) increasing the temperature.
- (D) doing all of these.

7. For a certain reaction the rate law is,  $\text{rate} = k[C]^{3/2}$ . If the rate of the reaction is  $0.020 \text{ M} \cdot \text{s}^{-1}$  when  $[C] = 1.0 \text{ M}$ , what is the rate when  $[C] = 0.60 \text{ M}$ ?

- (A)  $0.0093 \text{ M} \cdot \text{s}^{-1}$
- (B)  $0.012 \text{ M} \cdot \text{s}^{-1}$
- (C)  $0.013 \text{ M} \cdot \text{s}^{-1}$
- (D)  $0.010 \text{ M} \cdot \text{s}^{-1}$