Kinetics Worksheet 1

1. The rate of a chemical reaction between substances A and B is found to follow the rate equation 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) rate = $k[A]$
(B) rate = $k[A]^2[B]$
(C) rate = $k[A][B]$
(D) rate = $k[A]^2[B]^2$

3. The half-life of 14 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.
(C) order.
(B) molecularity.
(D) rate-determining step.

5. For a first-order reaction of half-life, 150 min., what is the rate constant in min^{-1}?
(A) 0.00104
(B) 0.00462
(C) 69.3
(D) 216

6. The rate of the reaction $2NO + Cl_2 \rightarrow 2\ NOCl$ is given by the rate equation rate = $k[NO]^2[Cl_2]$. The value of the rate constant can be increased by:
(A) increasing the concentration of NO.
(B) increasing the concentration of Cl_2 .
(C) increasing the temperature.
(D) doing all of these.

7. For a certain reaction the rate law is, rate = $k[C]^{3/2}$. If the rate of the reaction is 0.020 $M \cdot s^{-1}$ when [C] = 1.0 M, what is the rate when [C] = 0.60 M?
(A) 0.0093 $M \cdot s^{-1}$
(B) 0.012 $M \cdot s^{-1}$
(C) 0.013 $M \cdot s^{-1}$
(D) 0.010 $M \cdot s^{-1}$