Questions 1-4 refer to the following information.

A multi-step reaction takes place with the following elementary steps:

Step I.	$A + B \rightleftharpoons C$
Step II.	$C + A \rightarrow D$
Step III.	$D \rightarrow B + E$

1. What is the overall balanced equation for this reaction?

A. $2A + B + 2C + D \rightarrow C + D + B + E$
B. $A + B \rightarrow B + E$
C. $A + 2C \rightarrow D + E$
D. $2A \rightarrow E$

2. What is the function of species B in this reaction?

A. Without it, no reaction would take place.
B. It is a reaction intermediate that facilitates the progress of the reaction.
C. It is a catalyst that changes the overall order of the reaction.
D. It lowers the overall activation energy of the reaction.

3. If step II is the slow step for the reaction, what is the overall rate law?

A. Rate = k[A]2[B]
B. Rate = k[A][C]
C. Rate = k[A][B]
D. Rate = k[A]/[D]

4. Why would increasing the temperature make the reaction rate go up?

A. It is an endothermic reaction that needs an outside energy source to function.
B. The various molecules in the reactions will move faster and collide more often.
C. The overall activation energy of the reaction will be lowered.
D. A higher fraction of molecules will have the same activation energy.

5. $SO_2Cl_2 \rightarrow SO_2(g) + Cl_2(g)$

At 600 K, SO_2Cl_2 will decompose to form sulfur dioxide and chlorine gas via the above equation. If the reaction is found to be first order overall, which of the following will cause an increase in the half-life of SO_2Cl_2?

A. Increasing the initial concentration of SO_2Cl_2
B. Increasing the temperature at which the reaction occurs
C. Decreasing the overall pressure in the container
D. None of these will increase the half life.

6. $A + B \rightarrow C + D$

$rate = k[A][B]_2$

What are the potential units for the rate constant for the above reaction?

A. s^{-1}
B. $s^{-1}M^{-1}$
C. $s^{-1}M^{-2}$
D. $s^{-1}M^{-3}$

7. The following mechanism is proposed for a reaction:

$2A \leftrightarrow B$	(fast equilibrium)
$C + B \leftrightarrow D$	(slow)
$D + A \leftrightarrow E$	(fast)

Which of the following is the correct rate law for the complete reaction?

A. Rate = k[C]2[B]
B. Rate = k[C][A]2
C. Rate = k[C][A]3
D. Rate = k[D][A]

8. $2NOCl \rightarrow 2NO + Cl2$

The reaction above takes place with all of the reactants and products in the gaseous phase. Which of the following is true of the relative rates of disappearance of the reactants and appearance of the products?

A. NO appears at twice the rate that NOCl disappears.
B. NO appears at the same rate that NOCl disappears.
C. NO appears at half the rate that NOCl disappears.
D. Cl2 appears at the same rate that NOCl disappears.