Advanced Chemistry **NAME: _____PER: _____**
More Practice with Reaction Mechanisms WS

Concept Questions

_____ 1. The number of molecules that participates as reactants in elementary reactions is called _____.
a. molecularity
b. activation energy
c. transition states
d. reaction order

_____ 2. The rate determining step in a multistep reaction is usually the _____ step.
a. fast
b. slow

_____ 3. A _____ is neither a reactant nor product of a reaction, it is usually formed in one elementary reaction and consumed in the next.
a. catalyst
b. intermediate
c. active complex
d. molecularity

_____ 4. The steps by which a reaction occurs is called _____.
a. reaction rate
b. rate constant
c. reaction mechanism
d. reaction coordinate

_____ 5. Reactions that occur in a single event or step are called _____ reactions.
a. endothermic
b. exothermic
c. termolecular
d. elementary

_____ 6. In the following two step mechanism, who is considered the intermediate?
H_2O_2 (aq) + I^{-1} (aq) → H_2O (l) + IO^{-1} (aq)
IO^{-1} (aq) + H_2O_2 (aq) → H_2O (l) + O_2 (g) + I^{-1} (aq)
a. IO^{-1} (aq)
b. I^{-1} (aq)
c. H_2O (l)
d. H_2O_2 (aq)

_____ 7. A series of elementary reactions is known as _____ reactions.
a. endothermic
b. exothermic
c. complex
d. multi-step

_____ 8. What is the molecularity of the following reaction: OCl^- (aq) + H_2O(l) → HOCl(aq) + OH^-(aq)
a. unimolecular
b. bimolecular
c. polymolecular
d. multimolecular

_____ 9. What is the intermediate for the following mechanism?
H_2(g) + ICl(g) → HI(g) + HCl(g)
HI(g) + ICl(g) → I_2(g) + HCl(g)
a. H_2
b. HI
c. HCl
d. ICl

The kinetics of the reaction $2X + Y \rightarrow Z$ was experimentally tested, and the rate law was determined to be rate = $k[X]^2[Y]$. The following three mechanisms have been proposed for the reaction. Complete the table for each mechanism providing individual rate laws, molecularity, overall reaction, and overall rate law of the mechanism. Finally, determine which mechanism fits the chemical equation and rate law given above.

Mechanism 1		Elementary Step	Speed	Individual Rate Law	Molecularity
	Step 1	$Y \rightleftharpoons M$	(fast, equilibrium)		
	Step 2	$X + M \rightarrow N$	(slow)		
	Step 3	$N + X \rightarrow Z$	(fast)		
	Overall Reaction				
	Overall Rate Law				

Mechanism 2		Elementary Step	Speed	Individual Rate Law	Molecularity
	Step 1	$X + Y \rightleftharpoons M$	(fast, equilibrium		
	Step 2	$M + X \rightarrow D$	(slow)		
	Overall Reaction				
	Overall Rate Law				

Mechanism 3		Elementary Step	Speed	Individual Rate Law	Molecularity
	Step 1	$Y + X \rightarrow M$	Slow		
	Step 2	$M + W \rightarrow Z$	fast		
	Overall Reaction				
	Overall Rate Law				

The mechanism that was consistent with the overall reaction and rate law from the experiment was mechanism _____.

a) 1
b) 2
c) 3
d) None of the following