Chapter 14, Extra Problem 2. Consider the hypothetical reaction $A_2(g) + 2B(g) + 2C_2(g) \rightarrow 2AC(g) + 2BC(g)$ for which the following kinetic data have been collected.

Exp.	$[A_2]$, mol/L	[B], mol/L	$[C_2]$, mol/L	Rate, mol/L·s
1	0.120	0.240	0.120	3.62×10^{-4}
2	0.480	0.240	0.120	7.24×10^{-4}
3	0.480	0.240	0.360	7.24×10^{-4}
4	0.480	0.120	0.240	3.62×10^{-4}

(a) Determine the rate law expression for the reaction. (b) Calculate the value of the rate constant, k, with the proper units.

Chapter 14, Extra Problem 3: Consider the hypothetical reaction $A_2(g) + 2B(g) + 2C_2(g) \rightarrow 2AC(g) + 2BC(g)$ for which the experimentally determined rate law has been found to be $Rate = k[A_2]^{1/2}[B]$. The following two mechanisms have been proposed for this reaction.

Mechanism I:

$A_2 \rightleftharpoons 2A$	fast equilibrium
$A + B \rightleftharpoons AB$	fast equilibrium
$AB + C_2 \rightarrow AC + BC$	slow

Mechanism II:

$A_2 \rightleftharpoons 2A$	fast equilibrium
$A + B \rightarrow AB$	slow
$AB + C_2 \rightarrow AC + BC$	fast

(a) Show that both proposed mechanisms are consistent with the overall stoichiometry of the reaction, $A_2(g) + 2B(g) + 2C_2(g) \rightarrow 2AC(g) + 2BC(g)$.

(b) What species are reaction intermediates in each mechanism?

(c) Derive the rate law expression for each mechanism in terms of observable reactant species (A_2, B, and C_2). On the basis of your rate law expressions, which mechanism is more plausible?