AP Chemistry Exam Review
Free Response Practice #5

$2\ NO(g) + Br_2(g) \rightarrow 2\ NOBr(g)$

1. The following results were obtained in experiments designed to study the rate of the reaction above.

Experiment	Initial Concentration (mol/L) [NO]	[Br_2]	Initial Rate of Appearance of NOBr (*M*/sec)
1	0.02	0.02	9.6×10^{-2}
2	0.04	0.02	3.8×10^{-1}
3	0.02	0.04	1.9×10^{-1}

a. Write the rate law for the reaction. Justify. [3 points]

b. Calculate the value of the rate constant, *k*, for the reaction. Include units. [2 points]

c. Determine the initial rate of the reaction in experiment 1. [1 point]

d. Which sof the following reaction mechanisms is consistent with the rate law established in (a)? Explain your choice. [2 points]

I. $NO + NO \rightleftharpoons N_2O_2$ (fast)

$N_2O_2 + Br_2 \rightarrow 2NOBr$ (slow)

II. $Br_2 \rightarrow Br + Br$ (slow)

$2(NO + Br \rightarrow NOBr)$ (fast)