Rate Laws of Elementary rxns.

Rate = k [React] ^{coeff}

1. Write the rate law for each of the following elementary reactions:
   (a) $I_2(g) \rightarrow 2I(g)$
   (b) $H_2(g) + Br_2(g) \rightarrow 2\ HBr(g)$
   (c) $CH_3Br(aq) + OH^-(aq) \rightarrow CH_3OH(aq) + Br^-(aq)$
   (d) $1N_2O_4(g) \rightarrow 2\ NO_2(g)$
   (e) $2KCl(s) + 3\ O2\ (g) \rightarrow 2\ KClO3(s)$
   (f) $CO_2\ (g) + HOH\ (l) \text{-->} H2CO3\ (aq)$

2. For the reaction

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

   a. Write the rate law for the above elementary rxn.
   b. If the value of the rate law constant is 2.0 @ 100C. What would the initial rate of the rxn be if the concentrations of the reactants are:
      [NO] = 2.0 Molar and [Br2] = 0.5 Molar
      [NO] = 2.0 Molar and [Br2] = 1.0 Molar
      [NO] = 4.0Molar and [Br2] = 0.5 Molar
      [NO] = 0.25 Molar and [Br2] = 3.0 Molar

3. For the reaction

   $2KCl(s) + 3\ O2\ (g) \rightarrow 2\ KClO3(s)$

   a. Write the rate law for the above elementary rxn.
   b. If the rate is 1.2 M/sec @ 25 degrees C, when the concentration of O2 is 5.0 Molar, what is the value of the rate law constant?
   c. What are the units of the rate law constant?
   d. If at the same temperature the concentration of O2 is lowered to 2.0 Molar, what will the initial rate of the rxn be?

4. For the rxn

   $1\ A + 2\ C \rightarrow D + 3\ X$

   a. If the rate of the rxn is - 3 Molar/sec with respect to reactant A. What is the rate of disappearance of C?
   b. If the rate of the rxn is -1.2 Molar/sec with respect to A. What is the rate of appearance of X?
   c. What is the rate law for this rxn, assuming that A and C are not solid, liquid water, or catalysts?
   d. If the rate of the rxn is 8.0 M/s when the constant is 0.6 and the concentration of A = 3.0 Molar, what was the initial concentration of C?