4.1 ANSWERS TO EXERCISES

4.1 Exercise 1

1. change in concentration of reactants or products per unit time
2. a) 1 wrt A, 2 wrt B
   b) 3
   c) 250 $mol^{-2}dm^6s^{-1}$
   d) 2.5×10^{-4} $moldm^{-3}s^{-1}$
3. 8.3×10^{-3} $mol^{-1}dm^3s^{-1}$
   rate determining step does not involve hydrogen
4. rate = $k[PCl_3][Cl_2]^2$ $k = 1.05 \times 10^{-3}$ $mol^{-2}dm^6s^{-1}$
5. 2.00 $mol^{-2}dm^6s^{-1}$
6. rate = $k[H_2][NO]^2$ $k = 8.3 \times 10^4$ $mol^{-2}dm^6s^{-1}$

4.1 Exercise 2

a) will increase
greater collision energy
so greater chance of activation energy being exceeded
so greater fraction of successful collisions
k increases

b) will increase
more particles per unit volume
so collision frequency increases
k unchanged

c) will increase
more particles per unit volume
so collision frequency increases
k unchanged

d) will increase
alternative reaction pathway
so lower activation energy
so greater fraction of successful collisions
(k increases unless catalyst in rate equation in which case k unchanged)