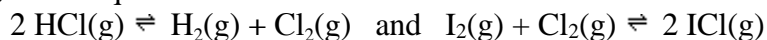


Chem 102 Week 9 Group quiz (Do these for practice by yourself then compare your answers with those given on the next page)

(1) If the equilibrium constants for the two reactions



are denoted  $K_1$  and  $K_2$  respectively, then the equilibrium constant for the reaction



(2) The equilibrium constant expression for the reaction shown below is  $\underline{\hspace{2cm}}$



(3) The equilibrium constant for the reaction  $\text{NO(g)} + 1/2 \text{O}_2\text{(g)} \rightleftharpoons \text{NO}_2\text{(g)}$

has a value of  $K_c = 1.23$  at a certain temperature. What is the value of  $K_c$  for the reaction



(4) Consider the equilibrium reaction  $2 \text{NO}_2\text{(g)} \rightleftharpoons \text{N}_2\text{O}_4\text{(g)}$ .

A sample of pure  $\text{NO}_2\text{(g)}$  of concentration 0.140 M is allowed to come to equilibrium. It is then found that 57.0 % of the  $\text{NO}_2\text{(g)}$  has reacted to form  $\text{N}_2\text{O}_4\text{(g)}$ . What is the value of  $K_c$ ?

(5) For the reaction  $2\text{A} \rightleftharpoons \text{B}$   $K_c = 1.4 \times 10^{15}$ .

In an equilibrium mixture,  $[\text{A}] = 0.45 \text{ M}$ . What is the concentration of B?

answers:

(1)  $K = K_1 K_2$

(2)  $K = [\text{Ag}^+]^3 [\text{PO}_4^{3-}]$

(3) The desired equation is the reverse of the given and double its coefficient, therefore the new  $K' = 1/(K)^2 = 1/(1.23)^2 = 0.66$

(4) Use ICE method:  $2 \text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g})$ .  $\text{NO}_2$  reacted =  $(.140\text{M})(.570) = 0.0798\text{M}$

So:  $\text{NO}_2$  remaining =  $.140 - 0.0798 = 0.0602\text{M}$

and  $\text{N}_2\text{O}_4$  formed =  $(.0798\text{M NO}_2)(1\text{mol N}_2\text{O}_4 / 2 \text{ mol NO}_2) = 0.0399 \text{ M}$

$K = [\text{N}_2\text{O}_4] / [\text{NO}_2]^2 = .0399 / (.0602)^2 = 11.0$

(5)  $K_c = [\text{B}] / [\text{A}]^2 \Rightarrow [\text{B}] = K_c [\text{A}]^2 = (1.4 \times 10^{15})(.45)^2 = 2.8 \times 10^{14}$