# Day 10: At equilibrium



Period 19

- Quiz on Le Chatelier's Principle

- Go over equilibrium expressions worksheet

- Mathematical examples

(1) Example #1 :

$$2\ HCl_{(g)} + F_{2\,(g)} \Leftrightarrow Cl_{2\,(g)} + 2\ HF_{(g)}$$

At a certain temperature, the equilibrium concentrations were found to be as follows : [HCl] = 0.50 M [$F_2$] = 0.40 M [$Cl_2$] = 2.0 M [HF] = 0.60 M. From this data, calculate Keq.

Answer #1 :

$$Keq = \frac{[Cl_2][HF]^2}{[HCl]^2[F_2]} = \frac{(2.0)(0.60)^2}{(0.50)^2(0.40)} = 7.2$$

note : it is acceptable to leave out units for Keq because they don't really mean anything and there is no standard unit for this constant.

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(1) Example #2 :

$$2\ HI_{(g)} \Leftrightarrow H_{2\,(g)} + I_{2\,(g)}$$

At a certain temperature, [$H_2$] = $2.5 \times 10^{-2}$ M and [$I_2$] = $3.1 \times 10^{-2}$ M. If Keq is $8.6 \times 10^{-2}$, calculate the equilibrium [HI].

Answer #2 :

$$Keq = \frac{[H2][I2]}{[HI]^2} \qquad [HI]^2 = \frac{[H_2][I_2]}{Keq}$$

$$[HI]^2 = \frac{(2.5 \times 10^{-2})(3.1 \times 10^{-2})}{(8.6 \times 10^{-2})}$$

$$[HI]^2 = 9.0 \times 10^{-3}$$

$$[HI] = 9.5 \times 10^{-2}\ M$$

note : even though no unit was given for Keq it is understood that there is a unit for concentration - moles per litre or M for short.

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PS#7