Equilibrium Worksheet #2

1. E
2. D (B&C)
3. True
4. II & III are true E
5. $K = \frac{[NO_2]^2}{[N_2O_4]} = \frac{(1.41 \times 10^{-2})^2}{4.22 \times 10^{-2}} = \frac{1.9881 \times 10^{-4}}{4.27 \times 10^{-2}} = 4.66 \times 10^{-3}$

   D
6. $N_2(g)$ = gaseous nitrogen; $H_2(g)$ = gaseous hydrogen; $NH_3(g)$ = gaseous ammonia

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

balanced

$$K = \frac{[NH_3]^2}{[N_2][H_2]^3}$$ D

(7) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ $K = \frac{[SO_3]^2}{[SO_2]^2[O_2]}$ (A)

balanced!

(8) $K = \frac{[F]^2}{[F_2]} = \frac{(2\times10^{-4})^2}{1\times10^{-2}} = \frac{4\times10^{-8}}{1\times10^{-2}} = 4\times\frac{10^{-8}}{10^{-2}} = 4\times10^{-6}$ (C)

(9) $K = \frac{[NO_2]^2}{[NO]^2[O_2]}$ the reaction should have been

$2NO_{(g)} + O_{2(g)} \rightleftharpoons 2NO_{2(g)}$

I apologize for the typo errors,

$K = \frac{(3\times10^{-3})^2}{(2\times10^{-3})^2(1\times10^{-2})} = \frac{9\times10^{-6}}{(4\times10^{-6})(1\times10^{-2})} = \frac{9\times10^{-6}}{4\times10^{-8}} = 2.25\times10^2 = 225$

$= 230$ ← 2 sig figs

(B)

(10) A is a solid and B is a liquid; liquids & solids do not go into K_{eq} expression,

$K = [C][D]^4$ (D)

(11) $Xe_{(g)} + 2F_{2(g)} \rightarrow XeF_{4(s)}$ $K = \frac{1}{[Xe][F_2]^2}$ (C)

balanced

does not go into K_{eq} expression

(12) D solids don't go into K_{eq} expression

(13) $[A]=[B]$, and $[C]=[D]=1.3M$ $K = \frac{[C][D]}{[A][B]} = \frac{1.3^2}{x^2} = 2.6$

let $x=[A]=[B]$

$\frac{1.3^2}{2.6} = x^2$

$0.65 = x^2$

$0.806M = x$

(D)

(14) $K = \frac{[CO_2][H_2]}{[H_2O][CO]} = \frac{(1.8)(1.4)}{(.26)([CO])} = 3.88$

$[CO] = 2.5$ (B)