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# Chapter 13 Set 2

45) a. $\frac{(1)^2}{(1)(1)} = 1$ $Q > K$, shift left

b. $\frac{(0.042)^2}{(0.04)(0.49)} = 0.09$ $Q = K$, equilibrium

c. $\frac{(0.083)^2}{(3.33 \times 10^{-4})(0.187)} = 111.6$ $Q > K$, shift left

46) a. $\frac{(0.11)(2)}{(0.012)^2} = 1.5 \times 10^3$ $Q < K_p$, shift right

b. $\frac{(0.36)(0.67)}{(0.0078)^2} = 4.0 \times 10^3$ $Q > K_p$, shift left

c. $\frac{(0.51)(0.18)}{(0.0062)^2} = 2.4 \times 10^3$ $Q = K_p$, equilibrium

49) $\frac{(1.9 \times 10^{-2})^2 \, O_2}{(1.1 \times 10^{-1})^2} = 2.4 \times 10^{-3} \Rightarrow [O_2] = 0.08M$

$0.08 \cdot 2 = 0.16$

51)

| | $SO_2$ | $NO_2$ | $SO_3$ | NO |
|---|---|---|---|---|
| I | 2 | 2 | 0 | 0 |
| C | $-x$ | $-x$ | $+x$ | $+x$ |
| E | $2-x$ | $2-x$ | $x$ | 1.3 |

$\frac{1.3(1.3)}{(0.7)(0.7)} = 3.45$

53)

| | $2SO_3$ | $2SO_2$ | $O_2$ |
|---|---|---|---|
| I | 4 | 0 | 0 |
| C | $-2x$ | $+2x$ | $+x$ |
| E | $4-2x$ | 1 | $x$ |

$\frac{(1)^2(0.5)}{3^2} = 3.45$

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| | $3H_2$ | $N_2$ | $2NH_3$ |
|---|---|---|---|
| I | 11 | 10 | 0 |
| C | $-3x$ | $-x$ | $+2x$ |
| E | 5 | 8 | 4 |