

CHAPTER 7 BLM ANSWER KEY

BLM 7-2: More on Entropy and Free Energy

Answers

- ΔG is positive, the reaction is non-spontaneous. If ΔG is negative, the reaction is spontaneous. If ΔG is equal to zero, then the reaction is at equilibrium.
- (a) $\Delta G = 1560 \text{ J}$; non-spontaneous
(b) $\Delta G = -31874 \text{ J}$; spontaneous
- $T = 1500 \text{ K}$ or 1227°C

BLM 7-3: Chemical Equilibrium of Gases

Answers

- $$K_p = \frac{P_{\text{PCl}_3} \times P_{\text{Cl}_2}}{P_{\text{PCl}_5}}$$
- 2.1 atm
- 0.15 mol
- $K_c = 2.4 \times 10^{-2}$

BLM 7-4: Chapter 9 Test

Answers

- (a) $K_c = \frac{[\text{CO}_2][\text{H}_2]}{[\text{CO}][\text{H}_2\text{O}]}$
(b) $K_c = \frac{[\text{IF}_5]^2[\text{I}_4\text{F}_2]}{[\text{I}_2]^3[\text{F}_2]^6}$
- $[\text{HBr}] = 0.25 \text{ mol/L}$
 $[\text{H}_2] = [\text{Br}_2] = 1.7 \times 10^{-4} \text{ mol/L}$
- $Q_c = 0.89$
 $Q_c < K_c$; equilibrium will shift to the right
- (a) $[\text{PCl}_5] = 0.021 \text{ mol/L}$
 $[\text{PCl}_3] = 0.029 \text{ mol/L}$
 $[\text{Cl}_2] = 0.029 \text{ mol/L}$
(b) right; right; left; left; no change
- (a) $Q_c = 0.49$
 $Q_c > K_c$; equilibrium will shift to the left
(b) (a) $Q_c = 1.9$
 $Q_c > K_c$; equilibrium will shift to the left
 $[\text{H}_2]$ and $[\text{N}_2]$ will increase, $[\text{NH}_3]$ will decrease
- (a) right
(b) right
(c) right
(d) right
(e) left