

Comments and Errors

Solution Manual, Chemical Principles, 6th Edition

Chapter 1

1.45

Solution manual states $\Delta v = 5.0 \text{ m}\cdot\text{s}^{-1}$

Velocity was given as $5.00 \pm 5.0 \text{ m}\cdot\text{s}^{-1}$

Therefore $\Delta v = 10.0 \text{ m}\cdot\text{s}^{-1}$

With the correction, the final answer is: $\Delta x = 6.7 \times 10^{-37} \text{ m}$

Chapter 2

2.55(c)

Typo. Correct answer: $(n-1)d^3 \text{ ns}^2$

2.59

Asks to list the ionic radius in increasing order.

The solution manual puts it in decreasing order.

Error: $\text{P}^{3-} > \text{S}^{2-} > \text{Cl}^-$

Correction: $\text{Cl}^- < \text{S}^{2-} < \text{P}^{3-}$

2.93

In the picture, it shows A (smaller atom) + B (larger atom) \rightarrow C (larger ion) + D (smaller ion)

The solution manual says that A=Na and B=Cl, and it references Figure 2.20 which explicitly lists the atomic radius of Na to be 154 pm and the atomic radius of Cl to be 99 pm.

It also says that C= Na^+ and D= Cl^- , referencing Figure 2.22 which shows that the ionic radius of Na^+ to be 102 pm and the ionic radius of Cl^- to be 181 pm.

Error: A=Na; B=Cl; C= Na^+ ; D= Cl^-

Correction: A=Cl ; B=Na; C= Cl^- ; D= Na^+

Chapter 4

4.25(d) asks for the Lewis structure of SF_4 and whether it is polar or nonpolar.

Answer shows the Lewis structure for SCl_4 . Another typo. Since these two compounds are isostructural they are both polar (and does not change the answer).

Chapter 8

8.63

The enthalpy of formation of $K_2S(aq)$ is given as $-417.5 \text{ kJ}\cdot\text{mol}^{-1}$ when it should be $-471.5 \text{ kJ}\cdot\text{mol}^{-1}$ (as correctly given in Appendix 2 of the textbook).

The answer given is $+15.28 \text{ kJ}$ but should be -38.72 kJ .

Chapter 9

9.13

First calculate the decrease in entropy resulting from the decrease in volume. Then calculate the increase in entropy resulting from the increase in temperature. Then add these to get the net entropy change. Assume ideal behavior and 1 mol N_2 gas.

$$\begin{aligned}\Delta S &= nR \ln \frac{V_2}{V_1} \\ &= (1.00 \text{ mol})(8.314 \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}) \ln \frac{0.500 \text{ L}}{3.00 \text{ L}} \\ &= -14.897 \text{ J}\cdot\text{K}^{-1} \quad (-14.9 \text{ J}\cdot\text{K}^{-1} \text{ using 3 sig. fig.})\end{aligned}$$

$$\begin{aligned}\Delta S &= nC_v \ln \frac{T_2}{T_1} \text{ where } C_v = \frac{5}{2} R \text{ for a diatomic ideal gas} \\ &= (1.00 \text{ mol}) \frac{5}{2} (8.314 \text{ J}\cdot\text{K}^{-1}\cdot\text{mol}^{-1}) \ln \frac{301.25 \text{ K}}{291.65 \text{ K}} \\ &= 0.673 \text{ J}\cdot\text{K}^{-1}\end{aligned}$$

Net change in entropy, $\Delta S_{\text{net}} = (-14.897 + 0.673) \text{ J}\cdot\text{K}^{-1} = -14.2 \text{ J}\cdot\text{K}^{-1}$
(Rounding off at the end using 3 sig. fig.)

9.35.

Students are asked to rank the ΔS for a series of gases during a temperature change.

$\Delta S = nC_v \ln(T_2/T_1)$ for an isochoric process

Gas A (1.00 mol monatomic ideal):

$\Delta S = nC_v \ln(T_2/T_1) = (1.00 \text{ moles})(3R/2)\ln(T_2/T_1)$ and because all undergo the same temperature change, ΔS is essentially $3R/2$.

Gas B (0.5 mol diatomic, no vibrational degrees of freedom):

$\Delta S = nC_v \ln(T_2/T_1) = (0.5 \text{ moles})(5R/2)\ln(T_2/T_1)$ and because all undergo the same temperature change, ΔS is essentially $5R/4$.

Gas C (0.5 mol diatomic, 1 vibrational degree of freedom):

$\Delta S = nC_v \ln(T_2/T_1) = (0.5 \text{ moles})(3R)\ln(T_2/T_1)$ and because all undergo the same temperature change, ΔS is essentially $3R/2$.

The answer provided ($B < C < A$) is incorrect. The answer should be $B < (C = A)$.

Chapter 11

11.17

Typo. The answer is $-2.7 \text{ kJ}\cdot\text{mol}^{-1}$. (not $-27 \text{ kJ}\cdot\text{mol}^{-1}$)

11.43

Question states: "x is the equilibrium concentration"

Should be: "x is the equilibrium partial pressure"

11.61

Typo, $x = \frac{+4.92 \pm 4.84}{1.12}$

No change to the final answer which is correct as is.

11.67

It is written that $3.2 * 10^{-34} = \frac{(x)(2.0)}{(4.0)^2} = \frac{x}{16}$ and should be $3.2 * 10^{-34} = \frac{(x)(2.0)}{(4.0)^2} = \frac{x}{8}$

Chapter 12

12.59(d)

Typo. The percent protonation should be 1.5% but it is given as 2.5%.

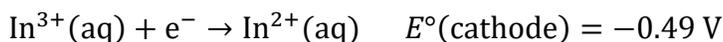
Chapter 14

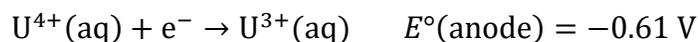
14.15(c).

The correct solution should have a 3 as the subscript for the nickel hydroxide reactant.



14.35(b)





$$E^{\circ}_{\text{cell}} = E^{\circ}(\text{cathode}) - E^{\circ}(\text{anode}) = -0.49 \text{ V} - 0.61 \text{ V} = +0.12 \text{ V}$$

$$\text{At } 25 \text{ }^{\circ}\text{C}, \ln K = \frac{(1)(+0.12 \text{ V})}{0.02569 \text{ V}} = +4.6$$

$$\therefore K \approx 10^2$$

14.107

Using $\Delta G^{\circ} = -nFE^{\circ}$ and $\Delta G^{\circ} = -RT \ln K$, one obtains the relationship $E^{\circ} = \frac{RT}{nF} \ln K$.

Must have $E^{\circ} = 0$ when $pH = 7$.

$pH = 7$ when concentration of H^{+} and OH^{-} are equal to $1 \times 10^{-7} \text{ mol.L}^{-1}$.

When $K = 1$, then $E^{\circ} = 0$.

Therefore, at $pH = 7$: $K = \frac{[H^{+}]}{[OH^{-}]} = \frac{1 \times 10^{-7} \text{ mol.L}^{-1}}{1 \times 10^{-7} \text{ mol.L}^{-1}} = 1$ and $E^{\circ} = 0$.

$$\text{At } pH = 1: E^{\circ} = \frac{RT}{nF} \ln K = 0.025693 \text{ V} \ln \frac{0.1 \text{ mol.L}^{-1}}{1 \times 10^{-13} \text{ mol.L}^{-1}} = +0.710 \text{ V}$$

$$\text{At } pH = 14: E^{\circ} = \frac{RT}{nF} \ln K = 0.025693 \text{ V} \ln \frac{1 \times 10^{-14} \text{ mol.L}^{-1}}{1 \text{ mol.L}^{-1}} = -0.828 \text{ V}$$

Chapter 17

17.31(d) should read: sodium diaquabis(oxalato)ferrate(III)