

Errata in the Students' Solutions Manual:

1-60: Answer should be given as "0%" with one significant figure, rather than as, "0.00%".

1-74: Missing units of "K" and "°F" on final answers.

2-72: The first answer should read, "Percentage of DHO in water = ..." and the second answer should be:

$$\text{Percentage of D}_2\text{O in water} = (0.000115)^2 \times 100 = 1.32 \times 10^{-6} \%$$

(Notice that we must convert 0.0115% to a probability before squaring).

5-46: Answer (c) should be an "F" with seven electron dots and no plus sign.

6-18: Answer (d) should be "AlBr₃" and there should be no answer (e).

6-64: Answer (a) should read, "The correct name is zinc chloride" not, "zinc oxide" and there should be no answer (e).

7-48: The right-hand Lewis formula in (a) should have a single bond between the O and H atoms, not a double bond.

8-10: Each of the answers should also have the steric number given as follows: (a) SN=6, (b) SN=4, (c) SN=4, (d) SN=5.

8-16: The bond angle in answer (b) should be, "<109.5°", rather than, "<120°"

8-18: The bond angle in answer (a) should be, "<109.5°", rather than, "109.5°"

8-68: Following "Thus we have" the answer should read, "(a) 1 and 8, (b) 3, (c) 2 and 9, (d) 1 and 2."

8-70: Following "Thus we have" the answer should read, "(a) 90°, (b) 90° and 120°, (c) 90°, (d) 120°"

9-76: The bottom-most hydrogen atom in the Lewis Formula should be a chlorine atom.

10-64b: Answer should be 6, not 12 and for iodine 6x (0 → 1).

12-6: Answer (b) is missing. The text for answer (b) should read:

(b) The number of moles of H₂SO₄ in the solution is

$$\begin{aligned} \text{moles of H}_2\text{SO}_4 &= MV = (2.00 \times 10^{-3} \text{ M})(2.00 \times 10^{-3} \text{ L}) \\ &= 4.00 \times 10^{-6} \text{ mol} \end{aligned}$$

13-58: The second line of the equation solving for P should read:

$$\frac{(0.08206 \text{ L} \cdot \text{atm} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}) \left(\frac{1 \text{ m}^3}{1000 \text{ L}} \right) (293.2 \text{ K})}{\pi \sqrt{2} (6.022 \times 10^{23} \text{ mol}^{-1}) (270 \times 10^{-12} \text{ m})^2 (1.00 \times 10^{-6} \text{ m})}$$

14-6: The end of the problem should be changed to read:

The change in volume is -4.0 L . The work done is given by

$$w = -P\Delta V = -(1.00 \text{ bar}) \left(\frac{10^5 \text{ Pa}}{1 \text{ bar}} \right) (-4.0 \text{ L}) \left(\frac{1 \text{ m}^3}{1000 \text{ L}} \right) = 400 \text{ J}$$

14-18: The units of q in the final equation should be "kJ" not "kJ·g⁻¹".

14-52: The 4th equation in the solution should be equal to "19.20 J·K⁻¹" not "18.61 J·K⁻¹". Also change "18.61 J·K⁻¹" to "19.20 J·K⁻¹" in the 6th equation which then gives in the last two equations:

$$1064 t_f = 3488^\circ \text{C}$$

and

$$t_f = \frac{3488^\circ \text{C}}{1064} = 3.3^\circ \text{C}$$

14-92: The units given at the end of the first equation should be, "kJ·glucose molecule⁻¹", those at the end of the second equation should be, "kJ·ATP molecule⁻¹" and the last equation should read:

$$\text{molecules of ATP per molecule of glucose} = \frac{4.6537 \times 10^{-21} \text{ kJ} \cdot \text{glucose molecule}^{-1}}{5.065 \times 10^{-23} \text{ kJ} \cdot \text{ATP molecule}^{-1}} = 92$$

14-96: The work in the second answer should be, "-13 L·bar" not, "-13.6 L·bar"

15-4: The 3rd math equation should begin " $q_p = \dots$ " instead of " $C_p = \dots$ "

15-42: Change text reading, "The length of the main diagonal is $\sqrt{3} l$, and so..." to, "The length of the main diagonal is $\sqrt{3} l$ (see Problem 15-55), and so..."

15-64: The units in the demoninator in the 4th equation should be, "cm⁻³" not, "cm⁻¹"

16-21: The second line of text (top of page 166) should read, "...and thus at 100°C, we have" not, "...and thus at 37°, we have"

17-20: Change "[B₂]" to "[Br₂]" in the rate law for the rate of reaction.

17-26: The last equation should read:

$$-k = \frac{-3.367 - (-4.576)}{0 \text{ min} - 14.0 \text{ min}} = -0.0864 \text{ min}^{-1}$$

17-58: The second equation is missing a negative sign:

$$t = -\frac{(2.41 \times 10^9 \text{ y})(\ln 0.90)}{0.693} = 3.7 \times 10^8 \text{ years}$$

19-36: The answer for part (b) is missing. It should read:

(b) Decreasing the reaction volume will cause the reaction equilibrium to shift to the right thereby reducing the number of moles of gaseous species present. The equilibrium concentration of NOBr(g) will increase and that of NO(g) will decrease.

19-64: The answer for part (a) should read: The equilibrium shifts toward the side with the *greater* total number of moles of gaseous species.

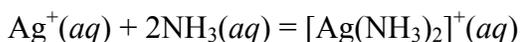
20-64: The last sentence of answer (a) should be changed to read, "It can act as an electron-pair donor and thus is a Lewis base."

21-18: The right hand side of the third and fourth equations should read, "= 0.676", not "=0.631"

21-52: In answer (2) change, "acidic acid solution" to, "acetic acid solution"

22-10: Answer should be "4.3 g·L⁻¹", not "4.3x10⁻³ g·L⁻¹"

22-24: In the first and third chemical equations there should not be a coefficient of "2" before the complex ion. The equation should read:



22-32: The K_a expression following the second chemical equation should be:

$$1/K_a = 1/6.3 \times 10^{-5} \text{ M}$$

and the last two lines of the solution should read:

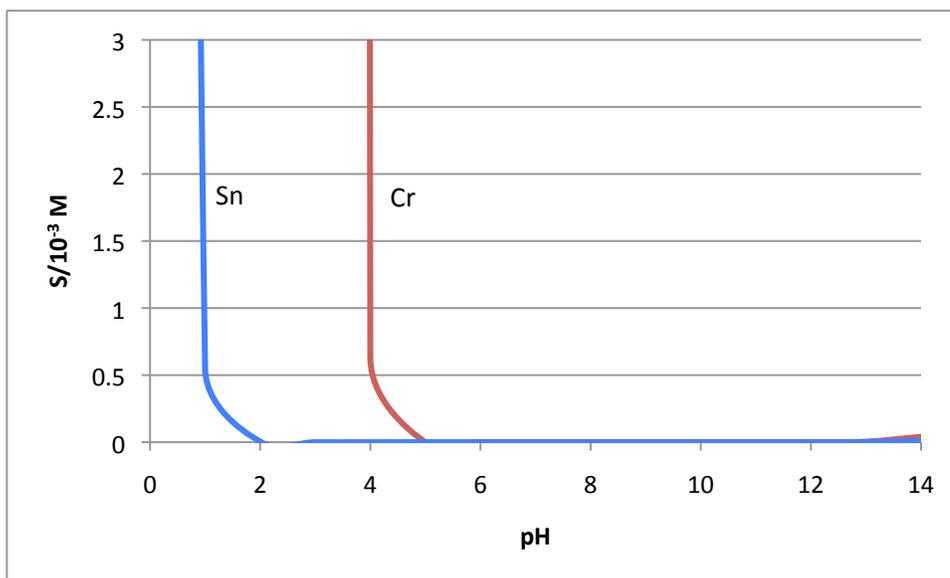
Taking the positive root, we find that $s = 6.3 \times 10^{-3} \text{ M}$, and so

$$s = (6.3 \times 10^{-3} \text{ M})(229.0 \text{ g} \cdot \text{mol}^{-1}) = 1.4 \text{ g} \cdot \text{L}^{-1}$$

22-36: The calculation of the moles of $\text{AgBr}(s)$ precipitated near the top of page 286 should read:

$$\begin{aligned} \text{moles of AgBr}(s) \text{ precipitated} &= (\text{initial moles of Br}^-) - (\text{final moles of Br}^-) \\ &= (5.0 \times 10^{-5} \text{ M})(0.100 \text{ L}) - (2.2 \times 10^{-12} \text{ M})(0.100 \text{ L}) \\ &= 5.0 \times 10^{-6} \text{ mol} \end{aligned}$$

22-94: The plot at the end of the solution and final line of text should be:



Thus, we see that the best separation is achieved between $\text{pH} = 3$ and $\text{pH} = 4$.

22-98: The solution should be:

(1) For equation 1, we have

$$K_1 = [\text{I}_2]$$

The solubility of $I_2(s)$ in pure water is 0.00132 M, thus

$$K_1 = 0.0013 \text{ M}$$

(2) For equation 2, we have

$$K_2 = \frac{[I_3^-]}{[I^-]}$$

The solubility of $I_2(s)$ in 0.100 M KI is 0.051 M. Iodine dissolves in $KI(aq)$ as $I_2(aq)$ and $I_3^-(aq)$. Thus, at equilibrium, we have

$$[I_2] + [I_3^-] = 0.051 \text{ M}$$

But $[I_2] = 0.0013 \text{ M}$ because the K_1 equilibrium must also be satisfied. Thus, at equilibrium

$$[I_3^-] = 0.051 \text{ M} - 0.0013 \text{ M} = 0.0497 \text{ M}$$

Thus the concentration of $I^-(aq)$ at equilibrium is given by

$$[I^-] = 0.100 \text{ M} - 0.0497 \text{ M} = 0.0503 \text{ M}$$

because the formation of $I_3^-(aq)$ decreases $[I^-]$ by an equal amount. The value of K_2 is

$$K_2 = \frac{[I_3^-]}{[I^-]} = \frac{0.0497 \text{ M}}{0.0503 \text{ M}} = 0.99$$

(3) Equation 3 is obtained by subtracting equation 1 from equation 2, thus

$$K_3 = \frac{K_2}{K_1} = \frac{0.99}{0.0013 \text{ M}} = 760 \text{ M}^{-1}$$

23-20: The reaction equation at the end of the solution should be written:

The reaction is spontaneous in the direction



24-6: The last line of (c) should read:

The oxidation states are: C, $4 - 2 = +2$ and N, $5 - 8 = -3$.

and the last line of (d) should read:

Therefore, the oxidation states are: C, $4 - 2 = +2$; N, $5 - 6 = -1$; and O, $6 - 8 = -2$.

24-32: The reducing agent should be, " $\text{HNO}_2(aq)$ " not " $\text{HNO}_3(aq)$ "

25-6: " $\text{Hg}(s)$ " in diagram should be " $\text{Hg}(l)$ "