

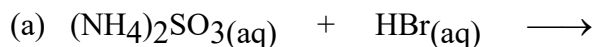
# Chem 10113, Quiz 3

October 3, 2018

# Answer Key

	IA (1)																VIIIA (18)	
1	1 <b>H</b> 1.0080	IIA (2)										III A (13)	IV A (14)	V A (15)	VIA (16)	VII A (17)	2 <b>He</b> 4.0026	
2	3 <b>Li</b> 6.9410	4 <b>Be</b> 9.0122										5 <b>B</b> 10.811	6 <b>C</b> 12.011	7 <b>N</b> 14.007	8 <b>O</b> 15.999	9 <b>F</b> 18.998	10 <b>Ne</b> 20.179	
3	11 <b>Na</b> 22.990	12 <b>Mg</b> 24.305	IIIB (3)	IVB (4)	VB (5)	VIB (6)	VII B (7)	VIII B (8)	VIII B (9)	VIII B (10)	IB (11)	IIB (12)	13 <b>Al</b> 26.982	14 <b>Si</b> 28.086	15 <b>P</b> 30.974	16 <b>S</b> 32.066	17 <b>Cl</b> 35.453	18 <b>Ar</b> 39.948
4	19 <b>K</b> 39.098	20 <b>Ca</b> 40.078	21 <b>Sc</b> 44.956	22 <b>Ti</b> 47.880	23 <b>V</b> 50.942	24 <b>Cr</b> 51.996	25 <b>Mn</b> 54.938	26 <b>Fe</b> 55.847	27 <b>Co</b> 58.933	28 <b>Ni</b> 58.690	29 <b>Cu</b> 63.546	30 <b>Zn</b> 65.380	31 <b>Ga</b> 69.723	32 <b>Ge</b> 72.610	33 <b>As</b> 74.922	34 <b>Se</b> 78.960	35 <b>Br</b> 79.904	36 <b>Kr</b> 83.800
5	37 <b>Rb</b> 85.468	38 <b>Sr</b> 87.620	39 <b>Y</b> 88.906	40 <b>Zr</b> 91.224	41 <b>Nb</b> 92.906	42 <b>Mo</b> 95.940	43 <b>Tc</b> 98.907	44 <b>Ru</b> 101.07	45 <b>Rh</b> 102.91	46 <b>Pd</b> 106.42	47 <b>Ag</b> 107.87	48 <b>Cd</b> 112.41	49 <b>In</b> 114.82	50 <b>Sn</b> 118.71	51 <b>Sb</b> 121.75	52 <b>Te</b> 127.60	53 <b>I</b> 126.90	54 <b>Xe</b> 131.29
6	55 <b>Cs</b> 132.91	56 <b>Ba</b> 137.33	57 <b>La</b> 138.91	72 <b>Hf</b> 178.49	73 <b>Ta</b> 180.95	74 <b>W</b> 183.85	75 <b>Re</b> 186.21	76 <b>Os</b> 190.20	77 <b>Ir</b> 192.22	78 <b>Pt</b> 195.09	79 <b>Au</b> 196.97	80 <b>Hg</b> 200.59	81 <b>Tl</b> 204.38	82 <b>Pb</b> 207.20	83 <b>Bi</b> 208.98	84 <b>Po</b> 208.98	85 <b>At</b> 209.99	86 <b>Rn</b> 222.02
7	87 <b>Fr</b> 223.02	88 <b>Ra</b> 226.03	89 <b>Ac</b> 227.03	104 Unq 261.11	105 Unp 262.11	106 Unh 263.12	107 Uns 262.12											

- (2 points)  $I_2O_3$  is the anhydride of  $HIO_2$ . The anhydride of  $Sr(OH)_2$  is  $SrO$ .
- (9 points) For each of the following reactions, write *balanced chemical equations* for both the molecular and the net ionic equations. If no reaction occurs, write No Reaction. Use subscripts [(s), (aq), (g), etc.] to indicate the phase of each compound or ion.



*molecular:*



*net ionic:*



*molecular:*



*net ionic:*



*molecular:*



*net ionic:*



3. (4 points) **SHOW ALL WORK.** Helium passes through a certain gas-separation membrane at the rate of 2.50 L per minute. Determine the volume (in Liters) of uranium hexafluoride (UF<sub>6</sub>) gas that should pass through the same membrane in 12.0 hours. (molar mass: UF<sub>6</sub> = 352)

**Graham's Law of Effusion**

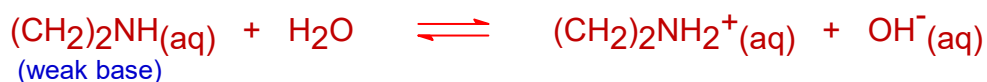
$$ER_{\text{He}} / ER_{\text{UF}_6} = \sqrt{FM_{\text{UF}_6} / FM_{\text{He}}}$$

$$(2.50 \text{ L/min}) / ER_{\text{UF}_6} = \sqrt{(352 / 4.00)} = 9.381$$

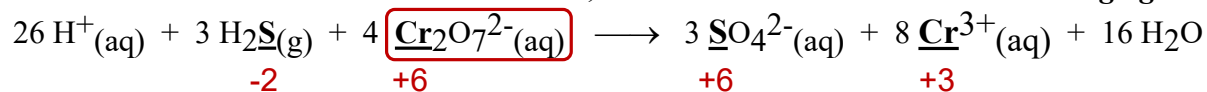
$$ER_{\text{UF}_6} = 0.2665 \text{ L/min}$$

$$(12.0 \text{ hr}) (60 \text{ min/hr}) (0.2665 \text{ L/min}) = 192 \text{ L}$$

4. (2 points) Write a complete, **balanced chemical equation** to show how aziridine, (CH<sub>2</sub>)<sub>2</sub>NH, behaves when dissolved in water. (Use the proper type of arrow in your equation!)



5. (3 points) In the following balanced redox equation, write the oxidation number of *each* underlined atom in the blanks below the formulas. Also, **circle** the substance that is the **oxidizing agent**.



6. (5 points) **SHOW ALL WORK.** Refer to the balanced chemical equation in question 5 above. Determine the volume (in mL) of H<sub>2</sub>S gas, measured at 22.0 °C and 735 torr, that is required to react completely with 150.0 mL of 0.0725 M K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution.

$$(0.150 \text{ L}) (0.0725 \text{ mole Cr}_2\text{O}_7^{2-} / \text{L}) (3 \text{ mole H}_2\text{S} / 4 \text{ Cr}_2\text{O}_7^{2-}) = 0.008156 \text{ mole H}_2\text{S}$$

$$P = (735 \text{ torr}) (1 \text{ atm} / 760 \text{ torr}) = 0.967 \text{ atm}$$

$$V = nRT/P = (0.008156 \text{ mole}) (0.0821 \text{ L}\cdot\text{atm/mole}\cdot\text{K}) (295 \text{ K}) / (0.967 \text{ atm})$$

$$V = 0.204 \text{ L} = 204 \text{ mL}$$