Name _____ AP Chemistry ___/___/___

Chapter 7 HW 5: Due 1/18/16 Complete the following multiple choice questions. All will be graded. Write your answer clearly on the line in front of the question.

Use the chart to the right to answer questions 1-4. Answers may be repeated.

(A)	1s 2s ↑
(B)	1s ↓↑ 2s ↓↑
(C)	1s ↓↑ 2s ↓↑ 2p ↑ ↑
(D)	1s ↓↑ 2s ↓↑ 2p ↓↑ ↓↑ ↓↑
(E)	[Ar] 4s ↓↑ 3d ↓↑ ↑ ↑ ↑ ↑

1. D Represents an atom that is chemically unreactive
2. A Represents an atom in an excited state
3. C Represents an atom that has four valence electrons.
4. E Represents an atom of a transition metal.

Question 5-6 refer to the following elements.
(A) Lithium (B) Nickel (C) Bromine (D) Uranium (E) Fluorine

5. E Is a gas in its standard state at 298 K
6. A Reacts with water to form a strong base
7. B What mass of Au is produced when 0.0500 mol of Au_2S_3 is reduced completely with excess H_2?
(A) 9.85 g (B) 19.7 g (C) 24.5 g (D) 39.4 g (E) 48.9 g

$Au_2S_3 + 3H_2 \rightarrow 2Au + 3H_2S$

.0500 | 2 | 197.
1 1

8. B When a solution of sodium chloride is vaporized in a flame, the color of the flame is
(A) blue (B) yellow (C) green (D) violet (E) white
9. D The safest and most effective emergency procedure to treat an acid splash on skin is to do which of the following immediately?
(A) Dry the affected area with paper towels
(B) Sprinkle the affected area with powdered $Na_2SO_4(s)$
(C) Flush the affected area with water and then with a dilute NaOH solution
(D) Flush the affected area with water and then with a dilute $NaHCO_3$ solution
(E) Flush the affected area with water and then with a dilute vinegar solution

$$\ldots C_{10}H_{12}O_4S(s) + 12\,O_2(g) \rightarrow 10\,CO_2(g) + \ldots SO_2(g) + 6\,H_2O(g)$$

10. C When the equation above is balanced and all coefficients are reduced to their lowest whole-number terms, the coefficient for $O_2(g)$ is?
(A) 6 (B) 7 (C) 12 (D) 14 (E) 28
11. C ... $Fe(OH)_2$ + ... O_2 + ... H_2O ---> ... $Fe(OH)_3$
If 1 mole of O_2 oxidizes $Fe(OH)_2$ according to the reaction represented above, how many moles of $Fe(OH)_3$ can be formed?
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6
12. C A 1.0 liter sample of an aqueous solution contains 0.10 mol of NaCl and 0.10 mol of $CaCl_2$. What is the minimum number of moles of $AgNO_3$ that must be added to the solution in order to precipitate all of the Cl^- as AgCl(s)?
(A) 0.10 mol (B) 0.20 mol (C) 0.30 mol (D) 0.40 mol (E) 0.60 mol
13. C The ionization energies for element X are listed in the table to the right. On the basis of the data, element X is most likely to be:
(A) Na (B) Mg (C) Al (D) Si (E) P

Ionization Energies for element X ($kJ\ mol^{-1}$)				
First	Second	Third	Fourth	Five
580	1815	2740	11600	14800

14. B A molecule or an ion is classified as a Lewis acid if it:
(A) accepts a proton from water
(B) accepts a pair of electrons to form a bond
(C) donates a pair of electrons to form a bond
(D) donates a proton to water
(E) has resonance Lewis electron-dot structures

. . . $Li_3N(s)$ + . . . $H_2O(l)$ ---> . . . $Li^+(aq)$ + . . . $OH^-(aq)$ + . . . $NH_3(g)$

15. C When the equation above is balanced and all coefficients reduced to lowest whole number terms, the coefficient for $OH^-(aq)$ is

(A) 1 (B) 2 (C) 3 (D) 4 (E) 6

16. D A sample of 61.8 g of H_3BO_3, a weak acid is dissolved in 1,000 g of water to make a 1.0-molal solution. Which of the following would be the best procedure to determine to molarity of the solution? (Assume no additional information is available.)

(A) Titration of the solution with standard acid (B) Measurement of the pH with a pH meter
(C) Determination of the boiling point of the solution (D) Measurement of the total volume of the solution
(E) Measurement of the specific heat of the solution

17. C A rigid metal tank contains oxygen gas. Which of the following applies to the gas in the tank when additional oxygen is added at constant temperature?

(A) The volume of the gas increase. (B) The pressure of the gas decreases.
(C) The average speed of the gas molecules remains the same. (D) The total number of gas molecules remains the same.
(E) The average distance between the gas molecules increases.

18. C When hafnium metal is heated in an atmosphere of chlorine gas, the product of the reaction is found to contain 62.2 percent Hf by mass and 37.4 percent Cl by mass. What is the empirical formula for this compound?

(A) HfCl (B) $HfCl_2$ (C) $HfCl_3$ (D) $HfCl_4$ (E) Hf_2Cl_3

19. D In the periodic table, as the atomic number increases from 11 to 17, what happens to the atomic radius?

(A) It remains constant. (B) It increases only. (C) It increases, then decreases.
(D) It decreases only. (E) It decreases, then increases.

20. E Which of the following is a correct interpretation of the results of Rutherford's experiments in which gold atoms were bombarded with alpha particles?

(A) Atoms have equal numbers of positive and negative charges. (B) Electrons in atoms are arranged in shells.
(C) Neutrons and protons in atoms have nearly equal mass. (D) Neutrons are at the center of an atom.
(E) The positive charge of an atom is concentrated in a small region.

$10\ HI + 2\ KMnO_4 + 3\ H_2SO_4 \rightarrow 5\ I_2 + 2\ MnSO_4 + K_2SO_4 + 8\ H_2O$

21. D According to the balanced equation above, how many moles of HI would be necessary to produce 2.5 mol of I_2, starting with 4.0 mol of $KMnO_4$ and 3.0 mol of H_2SO_4?

(A) 20 (B) 10 (C) 8.0 (D) 5.0 (E) 2.5

22. C On a mountaintop, it is observed that water boils at 90°C, not at 100°C as at sea level. This phenomenon occurs because on the mountaintop the

(A) equilibrium water vapor pressure is higher due to the higher atmospheric pressure
(B) equilibrium water vapor pressure is lower due to the higher atmospheric pressure
(C) equilibrium water vapor pressure equals the atmospheric pressure at a lower temperature
(D) water molecules have a higher average kinetic energy due to the lower atmospheric pressure
(E) water contains a greater concentration of dissolved gases

23. C A 40.0 mL sample of 0.25 M KOH is added to 60.0 mL of 0.15 M $Ba(OH)_2$. What is the molar concentration of $OH^-(aq)$ in the resulting solution? (Assume that the volumes are additive.

(A) 0.10 M (B) 0.19 M (C) 0.28 M (D) 0.40 M (E) 0.55 M

$40 \times 0.25 = 10$
$60 \times 0.15 = 9 \times 2 = 18$
$\frac{28}{100}$

$NH_4NO_3(s) \rightarrow N_2O(g) + 2\ H_2O(g)$

24. A A 0.03 mol sample of $NH_4NO_3(s)$ decomposes completely according to the balanced equation above. The total pressure in the flask measured at 400 K is closest to which of the following?

(A) 3 atm (B) 1 atm (C) 0.5 atm (D) 0.1 atm (E) 0.03 atm

$C_2H_4(g) + 3\ O_2(g) \rightarrow 2\ CO_2(g) + 2\ H_2O(g)$

25. E For the reaction of ethylene represented above, ΔH is - 1,323 kJ. What is the value of ΔH if the combustion produced liquid water $H_2O(l)$, rather than water vapor $H_2O(g)$? (ΔH for the phase change $H_2O(l) \rightarrow H_2O(g)$ is +44 kJ mol^{-1}.)

(A) -1,235 kJ (B) -1,279 kJ (C) -1,323 kJ (D) -1,367 kJ (E) -1,411 kJ