Name: _____   Date: _____

1. Which of the following is an extensive property?

   A) Mass
   B) Temperature
   C) Density
   D) Color
   E) Boiling point

2.   The result of $(3.8621 \times 1.5630) - 5.98$ is properly written as

   A) 0.06
   B) 0.056
   C) 0.0565
   D) 0.05646
   E) 0.056462

3. The density of mercury, the only metal to exist as a liquid at room temperature, is 13.6×10^3 kg/m^3. What is that density in pounds (lb) per cubic inch?
   (**1** in $= 2.54$ cm; **1** lb $= 454$ g)

   A) 0.491 lb/in^3
   B) 1.83×10^{-3} lb/in^3
   C) 376 lb/in^3
   D) 849 lb/in^3
   E) 7.61×10^{-2} lb/in^3

4. Which of these is an example of a *physical* change?

   A) Lead becomes a liquid when heated to 601°C
   B) Flammability of gasoline
   C) Corrosiveness of acid
   D) burning of wood
   E) Apples, when exposed to air, turn brown

5. Aluminum metal reacts with chlorine gas to form solid aluminum chloride. What mass of chlorine gas is needed to react completely with 163 g of aluminum?

$$2 \text{ Al(s)} + 3 \text{ Cl}_2(g) \rightarrow 2 \text{ AlCl}_3(s)$$
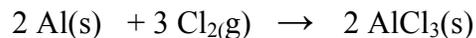
A) 643 g
B) 489 g
C) 321 g
D) 245 g
E) 214 g

6. After balancing the following equation, the mole ratio of FeS_2 to O_2 is found to be:

$$FeS_2 + O_2 \rightarrow FeSO_4 + SO_3$$
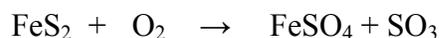
A) 2:7
B) 1:3
C) 2:3
D) 3:5
E) 1:1

7. The number of moles of sulfur atoms in 1.7×10^3 g of $Au_2(SO_4)_3$ is:

A) 7.5
B) 10.
C) 5.0
D) 2.5
E) 1.0

8. In the following reaction, how many moles of Fe would be produced from a mixture of 5 moles of Fe_2O_3 and 6 moles of C?

$$2Fe_2O_3(s) + 3C(s) \rightarrow 4Fe(s) + 3CO_2(g)$$
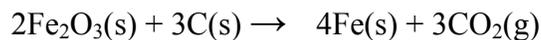
A) 8 moles
B) 10 moles
C) 11 moles
D) 22 moles
E) 5 moles

9. If 4.55 g of an oxide X_2O_5 contains 2.55 g of element X, what is the atomic weight of X?

    A) 51.0 amu
    B) 91.0 amu
    C) 31.4 amu
    D) 20.4 amu
    E) 45.5 amu

10. The mass of 1.63×10^{21} silicon atoms is:

    A) 7.60×10^{-2} g
    B) 4.58×10^{-2} g
    C) 1.40×10^{2} g
    D) 28.8 g
    E) 7.60 g

11. What is the oxidation number for sulfur in sulfuric acid, H_2SO_4?

    A) +6
    B) +4
    C) -2
    D) -4
    E) +1

12. What volume (in mL) of 0.112 M ammonium sulfate, $(NH_4)_2SO_4$, solution contains 5.75 g of ammonium ion?

    A) 1.42×10^{3}
    B) 566
    C) 1.13×10^{3}
    D) 698
    E) 132

13. A sample of 0.4307g of an unknown compound containing barium ions (Ba^{2+}) is dissolved in water and treated with an excess of Na_2SO_4. If the mass of the $BaSO_4$ precipitate formed is 0.4105 g, what is the percent by mass of Ba in the original unknown compound?

   A) 56.08 %
   B) 35.70 %
   C) 73.42 %
   D) 24.84 %
   E) 82.13 %

14. Based on the solubility rules, which one of these compounds should be *insoluble* in water?

   A) AgBr
   B) NaCl
   C) Na$_2$S
   D) KNO$_3$
   E) Na$_2$SO$_4$

15. Zinc dissolves in hydrochloric acid to yield hydrogen gas:
$$Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$$
What mass of hydrogen gas is produced when a 7.35 g of zinc dissolves in 500. mL of 1.200M HCl?

   A) 0.226 g
   B) 0.453 g
   C) 0.302 g
   D) 0.113 g
   E) 0.605 g

16. If the Thomson model of the atom had been correct, Rutherford would have observed

   A) alpha particles going through the foil with no deflection.
   B) **alpha particles greatly deflected by the metal foil.**
   C) alpha particles bouncing off the foil.
   D) positive particles formed in the foil.
   E) a hole formed in the foil because of penetration of alpha particles.

17. Which one of the following is <u>NOT</u> correctly named?

A) NH_4ClO_4, ammonium chlorate.
B) $Pb(NO_3)_2$, lead(II) nitrate.
C) H_3PO_4, phosphoric acid.
D) $Mg(OH)_2$, magnesium hydroxide.
E) P_2O_5, diphosphorous pentoxide.

18. Given the following data for the isotopes of the element X:

Isotope	Relative abundance
^{206}X	25.5 %
^{207}X	22.1 %
^{208}X	52.4 %

The element X most probably is:

A) Pb
B) Bi
C) Tl
D) Ag
E) Cr

19. Which one of the following is <u>NOT</u> correctly paired?

A) Cs, alkaline earth metal.
B) Cl, halogen.
C) Xe, noble gas.
D) Os, transition element.
E) Se, chalcogen.

20. How many protons (p), neutrons (n) and electron (e) does $^{30}S^{2-}$ ion have?

A) 16p , 14n , 18e
B) 14p , 16n , 14e
C) 30p , 14n , 30e
D) 16p , 14n , 16e
E) 16p , 14n , 14e

Answer Key

1. A
2. A
3. A
4. A
5. A
6. A
7. A
8. A
9. A
10. A
11. A
12. A
13. A
14. A
15. A
16. A
17. A
18. A
19. A
20. A