

Name Key (print) Name \_\_\_\_\_ (sign)

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$$1 \text{ mole} = \text{molar mass} = 6.022 \times 10^{23}$$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (2 pts each, 32 pts total)**

1) A physical change

- A) occurs when sugar is heated into caramel. *RXN*  
 B) occurs when propane is burned for heat. *RXN*  
 C) occurs when glucose is converted into energy within your cells. *RXN*  
 D) occurs when iron rusts. *RXN*  
 (E) occurs when water is evaporated.

1) E

2) Water is an example of

- (A) a compound. B) an element.  
 C) a heterogeneous mixture. D) a homogeneous mixture.

2) A

3) Identify a state of matter.

- A) density  
 B) odor  
 C) volume  
 D) melting point  
 (E) solid

3) E

4) The atomic number is equal to

- A) the sum of the number of protons, neutrons, and electrons.  
 (B) the number of the protons.  
 C) the sum of the number of protons and neutrons.  
 D) the sum of the number of the neutrons and electrons.

4) B

5) Identify a liquid.

- A) definite volume and definite shape  
 B) definite volume and no definite shape  
 C) definite shape and no definite volume  
 D) no definite shape and no definite volume

5) B

6) Identify the cation.

- A) Br B) Kr C) I<sub>2</sub> D) O<sup>2-</sup> (E) Sr<sup>2+</sup>

6) E

7) The statement, "In a chemical reaction, matter is neither created nor destroyed" is called

- A) the Law of Multiple Proportions.
- B) the Law of Definite Proportions.
- C) the Law of Conservation of Mass.
- D) the Scientific Method.
- E) Dalton's Atomic Theory.

7) C

8) Molecules can be described as

- A) two or more atoms chemically joined together.
- B) mixtures of two or more elements that has a specific ratio between components.
- C) heterogeneous mixtures.
- D) homogeneous mixtures.
- E) mixtures of two or more pure substances.

8) A

9) A covalent bond is best described as

- A) a bond between a metal and a nonmetal. (ionic)
- B) a bond between a metal and a polyatomic ion. (ionic)
- C) the sharing of electrons between atoms.
- D) a bond between two polyatomic ions. ionic
- E) the transfer of electrons. ionic

9) C

10) What is the empirical formula for  $\text{Hg}_2(\text{NO}_3)_2$ ?  $\div 2$

- A)  $\text{Hg}_4(\text{NO}_3)_4$
- B)  $\text{Hg}_2(\text{NO}_3)_2$
- C)  $\text{HgNO}_3$
- D)  $\text{Hg}(\text{NO}_3)_2$
- E)  $\text{Hg}_2\text{NO}_3$



10) C

11) Which of the following elements is in Period 4?

- A) Ag
- B) Ca
- C) Bi
- D) He
- E) Zr

11) B

12) How many significant figures are in the measurement, 0.003800 g?

- A) 4
- B) 5
- C) 6
- D) 7
- E) 8

12) A

13) Which of the following represent isotopes?



- A) A and C
- B) B and D
- C) A and D
- D) C and D
- E) all of the above

same atomic #  
different atomic mass

13) A

14) Which of the following exists as a diatomic molecule?

- A) lithium
- B) oxygen  $\rightarrow \text{O}_2$
- C) carbon
- D) phosphorus
- E) krypton

HOW + halogens

14) B

15) Which of the following elements is a metal?

A) He

B) Sb

C) Br

D) Ag

E) O

15) D

*left side of zigzag*

*lie*

16) Which of the following elements is a halogen?

A) Po

B) I

C) S

D) Kr

E) Sn

16) B





5. How many significant figures is in the following calculation: (show work, # of sig fig for each number or the column) (2 pts for work)

$$(99.2 + 81.234) / (1.011) = 178.470821 \quad (\text{calculator number})$$

correct # to correct significant figures is 178, 4 (2 pts)

$$\begin{array}{r} 99.2 \\ + 81.234 \\ \hline 180.434 \div 1.011 \\ \hline 178.4 \checkmark \end{array}$$

6. element symbol. (4 pts total, 2 pts each) given the symbol give the name. given the name give the symbols for the elements below.

Li lithium potassium K

7. For the element S answer the following. (The rest of this question is about this same element.) (6 pts total)

a) Give the electron configuration for the element in the format ( $1s^2, 2s^2, 2p^3, \dots$ ) (2 pt)



b) Give the valence electron configuration for the element in the same format as above. (2 pt)



c) How many protons 16 (1 pt) d) How many valence electrons for the neutral atom 6 (1 pt)

8. Match the following to the letters shown. The letters may only be used one time or not at all. (6 pts total, 3 pts each)

- (A) transition metal elements (B) lanthanide, actinide elements (C) main group elements (D) alkali metal elements (E) alkaline earth elements (F) halogens (G) noble gases (H) s block (I) p block (J) d block (K) f block (L) a period (M) a group

Periodic Table of the Elements

The image shows a standard periodic table with the following annotations:

- A large hand-drawn circle labeled **(A)** encloses the transition metal elements (groups 3-10).
- A smaller hand-drawn circle labeled **(F)** encloses the halogen elements (group 17).

~~Typo~~  $1.29 \times 10^{12}$

III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.

1. You are electroplating silver (Ag) onto a surface and you expect that you will have  $1.29 \times 10^{102}$  atoms of silver on this surface. How much would this many atoms of silver weigh? (Avogadro's number =  $6.022 \times 10^{23}$ ) (15 points)

47  
Ag  
107.8682

$$1 \text{ mol Ag} = 107.86 \text{ g Ag} = 6.022 \times 10^{23} \text{ atoms Ag}$$

$$\left( 1.29 \times 10^{12} \text{ atoms Ag} \right) \times \frac{1 \text{ mol Ag}}{6.022 \times 10^{23} \text{ atoms Ag}} \times \frac{107.86 \text{ g Ag}}{1 \text{ mol Ag}} = 2.31 \times 10^{-10}$$

2. You have confiscated an unknown substance which looks like platinum or silver or stainless steel from criminals. You are the crime scene investigator. Your job is to identify the substance. The substance is metallic and unreactive. In the field you measure the volume as 92.2 cups and its mass is 79.2 pounds. What is its density (density = mass / volume)? (You will then use a density table in **grams / mL** to identify the substance.) (4 cups = 1 quart, 4 quart = 1 gallon, 1.000 liters = 1.056688 quart, 453.593 grams = 1 pound) (15 points)

$$\frac{79.2 \text{ pounds}}{92.2 \text{ cups}} \longrightarrow \frac{? \text{ g}}{\text{ml}}$$

$$\frac{79.2 \text{ pounds}}{92.2 \text{ cups}} \times \frac{453.593 \text{ g}}{1 \text{ pound}} \times \frac{4 \text{ cups}}{1 \text{ quart}} \times \frac{1.056688 \text{ quart}}{1 \text{ liter}} \times \frac{1 \text{ liter}}{1000 \text{ ml}} = 1.65 \frac{\text{g}}{\text{ml}}$$

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$$1 \text{ mole} = \text{molar mass} = 6.022 \times 10^{23}$$

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (2 pts each, 32 pts total)**

- 1) Molecules can be described as 1) D  
 A) mixtures of two or more pure substances.  
 B) homogeneous mixtures.  
 C) heterogeneous mixtures.  
 D) two or more atoms chemically joined together.  
 E) mixtures of two or more elements that has a specific ratio between components.
- 2) The statement, "In a chemical reaction, matter is neither created nor destroyed" is called 2) D  
 A) the Scientific Method.  
 B) Dalton's Atomic Theory.  
 C) the Law of Definite Proportions.  
 D) the Law of Conservation of Mass.  
 E) the Law of Multiple Proportions.
- 3) Identify a liquid. 3) B  
 A) definite volume and definite shape  
 B)  definite volume and no definite shape  
 C) definite shape and no definite volume  
 D) no definite shape and no definite volume
- 4) A physical change 4) A  
 A) occurs when water is evaporated.  
 B) occurs when glucose is converted into energy within your cells.  
 C) occurs when propane is burned for heat.  
 D) occurs when sugar is heated into caramel.  
 E) occurs when iron rusts.
- 5) Identify a state of matter. 5) C  
 A) melting point  
 B) density  
 C) solid  
 D) volume  
 E) odor
- 6) Water is an example of 6) A  
 A) a compound.  
 B) an element.  
 C) a heterogeneous mixture.  
 D) a homogeneous mixture.

7) How many significant figures are in the measurement, 0.003800 g?

A) 4

B) 5

C) 6

D) 7

E) 8

7) A

8) The atomic number is equal to

A) the sum of the number of the neutrons and electrons.

B) the sum of the number of protons, neutrons, and electrons.

C) the sum of the number of protons and neutrons.

D) the number of the protons.

8) D

9) Which of the following represent isotopes?

A:  ${}^{79}_{34}\text{X}$

B:  ${}^{79}_{35}\text{X}$

C:  ${}^{78}_{34}\text{X}$

D:  ${}^{81}_{36}\text{X}$

9) D

A) B and D

B) C and D

C) A and D

D) A and C

E) all of the above

10) Which of the following elements is a metal?

A) Br

B) O

C) Ag

D) Sb

E) He

*left of periodic table*

*zig zag line*

10) C

11) Which of the following elements is a halogen?

A) Kr

B) I

C) Po

D) S

E) Sn

11) B

12) Identify the cation.

A) Br

B)  $\text{Sr}^{2+}$

C) Kr

D)  $\text{O}^{2-}$

E)  $\text{I}_2$

12) B

13) Which of the following elements is in Period 4?

A) Bi

B) He

C) Zr

D) Ag

E) Ca

13) E

14) A covalent bond is best described as

A) a bond between a metal and a polyatomic ion.

B) a bond between two polyatomic ions.

C) the transfer of electrons.

D) the sharing of electrons between atoms.

E) a bond between a metal and a nonmetal.

14) D

15) What is the empirical formula for  $\text{Hg}_2(\text{NO}_3)_2$ ?  $\div 2$

A)  $\text{Hg}_2\text{NO}_3$

B)  $\text{Hg}(\text{NO}_3)_2$

C)  $\text{Hg}_2(\text{NO}_3)_2$

D)  $\text{HgNO}_3$

E)  $\text{Hg}_4(\text{NO}_3)_4$

15) D

16) Which of the following exists as a diatomic molecule?

- A) lithium
- B) phosphorus
- C) krypton
- D) oxygen
- E) carbon

HON & halogen

16) D

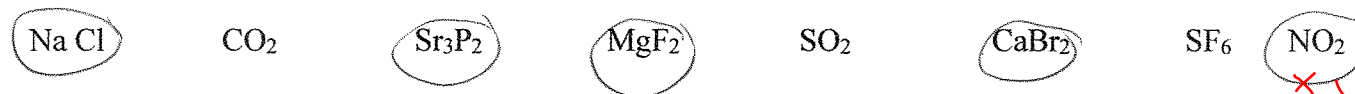
II. Short Answers (38 pts)

Please show work on all questions for partial credit even on questions which do not specify.

1. Circle the following which is an element (4 pts total, 1/2 pts each)



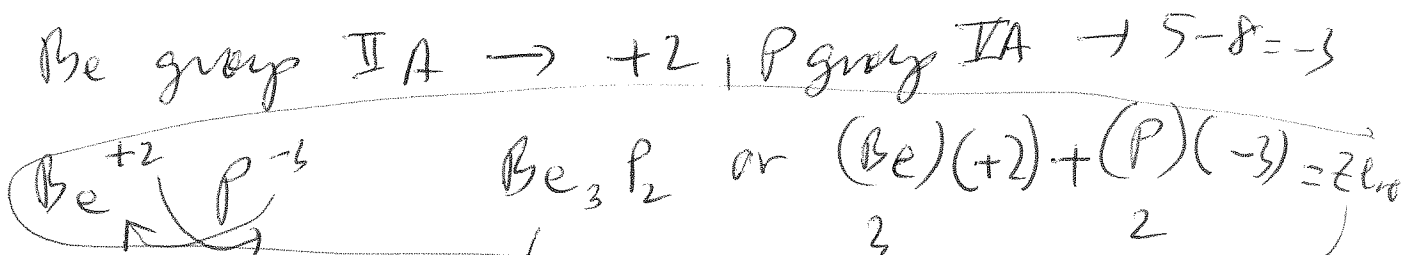
2. Given the following list of chemical formulas, circle all which are ionic (4 pts total, 1/2 pts each)



not circled

3. If you have a compound made up of the elements **Be** and **P** (6 pts total)

a) What are the charges on the ions made from those elements (show work) (2 pts)



b) Write the formula for the compound made from those elements. Showing work on how you arrived at the formula. (4 pts)

4. Metric prefixes (4 pts total, 2 pts each)

100 centiliter = 1 liter    1000 meter = 1 kilometer



5. How many significant figures is in the following calculation: (show work, # of sig fig for each number or the column) (2 pts for work)

$(327.02 - 17.100) * 8.3101 = 2575.466192$  (calculator number)

5 sig. 2575.5

$$\begin{array}{r} 327.02 \\ - 17.100 \\ \hline 309.92 \\ \hline 5 \text{ sig.} \end{array}$$

correct # to correct significant figures is \_\_\_\_\_ (2 pts)

6. element symbol. (4 pts total, 2 pts each)

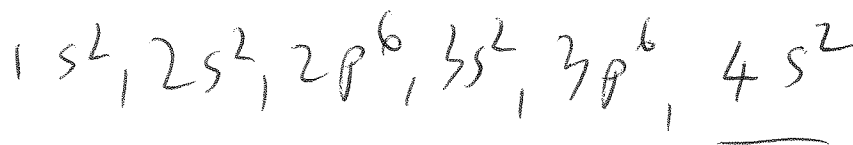
Given the symbol, write out the name, given the name give the symbol of the element.

B Boron

silicon Si

7. For the element Ca answer the following. (The rest of this question is about this same element.) (6 pts total)

a) Give the electron configuration for the element in the format ( $1s^2, 2s^2, 2p^3, \dots$  etc) (2 pt)



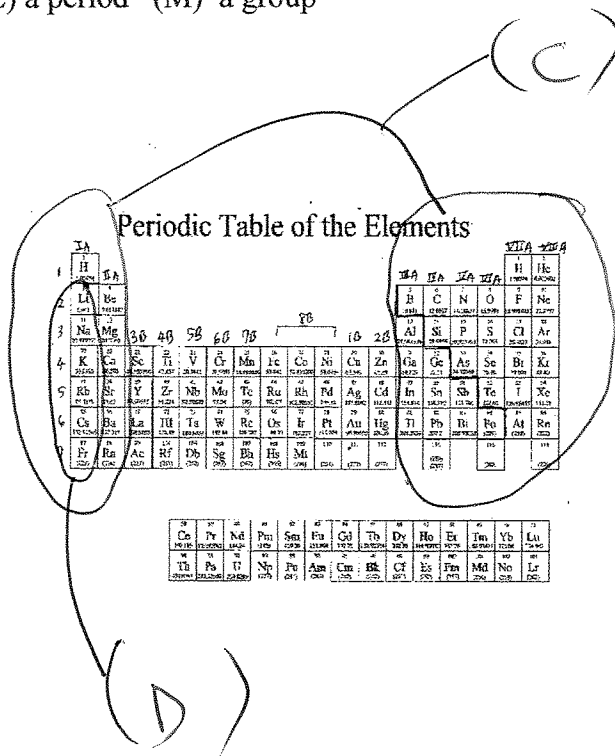
b) Give the valence electron configuration for the element in the same format as above. (2 pt)



c) How many protons 20 (1 pt) d) How many valence electrons for the neutral atom 2 (1 pt)

8. Match the following to the letters shown. The letters may only be used one time or not at all. (6 pts total, 3 pts each)

- (A) transition metal elements (B) lanthanide, actinide elements (C) main group elements (D) alkali metal elements (E) alkaline earth elements (F) halogens (G) noble gases (H) s block (I) p block (J) d block (K) f block (L) a period (M) a group



III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.

1. You are electroplating gold (Au) onto a surface and you expect that you will have  $7.98 \times 10^{28}$  atoms of gold on this surface. How much would this many atoms of gold weigh? (Avogadro's number =  $6.022 \times 10^{23}$  (15 points)

$7.98 \times 10^{28}$  atoms Au  $\rightarrow$  ( ) mass in g.

79  
Au  
196.967

$$1 \text{ mol Au} = 196.967 \text{ g Au} = 6.022 \times 10^{23} \text{ atoms Au}$$

$$7.98 \times 10^{28} \text{ atoms Au} \times \frac{196.967 \text{ g Au}}{6.022 \times 10^{23} \text{ atoms Au}} = 2.61 \times 10^5 \text{ g Au}$$

2. You have confiscated an unknown substance which looks like platinum or silver or stainless steel from criminals. You are the crime scene investigator. Your job is to identify the substance. The substance is metallic and unreactive. In the field you measure the volume as 78.2 cups and its mass is 99.2 pounds. What is its density (density = mass / volume)? (You will then use a density table in **grams / mL** to identify the substance.) (4 cups = 1 quart, 4 quart = 1 gallon, 1.000 liters = 1.056688 quart, 453.593 grams = 1 pound) (15 points)

$$\frac{78.2 \text{ cups}}{99.2 \text{ pounds}} \longrightarrow \frac{99.2 \text{ pounds}}{78.2 \text{ cups}} \longrightarrow \left( \frac{1 \text{ g}}{\text{ml}} \right)$$

$$\frac{99.2 \text{ pounds}}{78.2 \text{ cups}} \times \frac{453.593 \text{ g}}{1 \text{ pound}} \times \frac{4 \text{ cups}}{1 \text{ quart}} \times$$

$$\frac{1.057 \text{ quart}}{1 \text{ liter}} \times \frac{1 \text{ liter}}{1000 \text{ ml}} = 2.43 \frac{\text{g}}{\text{ml}}$$

Name \_\_\_\_\_ (print) Name \_\_\_\_\_ (sign)

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- 1) A physical change 1) \_\_\_\_\_  
 A) occurs when sugar is heated into caramel.  
 B) occurs when propane is burned for heat.  
 C) occurs when glucose is converted into energy within your cells.  
 D) occurs when iron rusts.  
 E) occurs when water is evaporated.
- 2) Water is an example of 2) \_\_\_\_\_  
 A) a compound. B) an element.  
 C) a heterogeneous mixture. D) a homogeneous mixture.
- 3) Identify a state of matter. 3) \_\_\_\_\_  
 A) density  
 B) odor  
 C) volume  
 D) melting point  
 E) solid
- 4) The atomic number is equal to 4) \_\_\_\_\_  
 A) the sum of the number of protons, neutrons, and electrons.  
 B) the number of the protons.  
 C) the sum of the number of protons and neutrons.  
 D) the sum of the number of the neutrons and electrons.
- 5) Identify a liquid. 5) \_\_\_\_\_  
 A) definite volume and definite shape B) definite volume and no definite shape  
 C) definite shape and no definite volume D) no definite shape and no definite volume
- 6) Identify the cation. 6) \_\_\_\_\_  
 A) Br B) Kr C) I<sub>2</sub> D) O<sup>2-</sup> E) Sr<sup>2+</sup>

- 7) The statement, "In a chemical reaction, matter is neither created nor destroyed" is called \_\_\_\_\_
- A) the Law of Multiple Proportions.
  - B) the Law of Definite Proportions.
  - C) the Law of Conservation of Mass.
  - D) the Scientific Method.
  - E) Dalton's Atomic Theory.
- 8) Molecules can be described as \_\_\_\_\_
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  - B) a bond between a metal and a polyatomic ion.
  - C) the sharing of electrons between atoms.
  - D) a bond between two polyatomic ions.
  - E) the transfer of electrons.
- 10) What is the empirical formula for  $\text{Hg}_2(\text{NO}_3)_2$ ? \_\_\_\_\_
- A)  $\text{Hg}_4(\text{NO}_3)_4$
  - B)  $\text{Hg}_2(\text{NO}_3)_2$
  - C)  $\text{HgNO}_3$
  - D)  $\text{Hg}(\text{NO}_3)_2$
  - E)  $\text{Hg}_2\text{NO}_3$
- 11) Which of the following elements is in Period 4? \_\_\_\_\_
- A) Ag                      B) Ca                      C) Bi                      D) He                      E) Zr
- 12) How many significant figures are in the measurement, 0.003800 g? \_\_\_\_\_
- A) 4                      B) 5                      C) 6                      D) 7                      E) 8
- 13) Which of the following represent isotopes? \_\_\_\_\_
- A:  ${}^{79}_{34}\text{X}$               B:  ${}^{79}_{35}\text{X}$               C:  ${}^{78}_{34}\text{X}$               D:  ${}^{81}_{36}\text{X}$
- A) A and C
  - B) B and D
  - C) A and D
  - D) C and D
  - E) all of the above
- 14) Which of the following exists as a diatomic molecule? \_\_\_\_\_
- A) lithium
  - B) oxygen
  - C) carbon
  - D) phosphorus
  - E) krypton



15) Which of the following elements is a metal?

A) He

B) Sb

C) Br

D) Ag

E) O

15) \_\_\_\_\_

16) Which of the following elements is a halogen?

A) Po

B) I

C) S

D) Kr

E) Sn

16) \_\_\_\_\_

II. Short Answers ( 38 pts)

Please show work on all questions for partial credit even on questions which do not specify.

1. Circle the following which is a compound (4 pts total, ½ pts each)

Cu          CCl<sub>4</sub>          K Cl          Al          Li Br          BCl<sub>3</sub>          C          Fe

2. Given the following list of chemical formulas, circle all which are covalent (4 pts total, ½ pts each)

Na Cl          CO<sub>2</sub>          Sr<sub>3</sub>P<sub>2</sub>          MgF<sub>2</sub>          SO<sub>2</sub>          CaBr<sub>2</sub>          SF<sub>6</sub>          NO<sub>2</sub>

3. If you have a compound made up of the elements **Ga** and **S** (6 pts total)

a) What are the charges on the ions made from those elements (show work) (2 pts)

b) Write the formula for the compound made from those elements. Showing work on how you arrived at the formula. (4 pts)

4. Metric prefixes (4 pts total, 2 pts each)

\_\_\_\_\_ meter = 1 kilometer          \_\_\_\_\_ milligram = 1 gram



5. How many significant figures is in the following calculation: (show work, # of sig fig for each number or the column) (2 pts for work)

$$(99.2 + 81.234) / (1.011) = 178.470821 \quad (\text{calculator number})$$

correct # to correct significant figures is \_\_\_\_\_ (2 pts)

6. element symbol. (4 pts total, 2 pts each) given the symbol give the name. given the name give the symbols for the elements below.

Li \_\_\_\_\_

potassium \_\_\_\_\_

7. For the element S answer the following. (The rest of this question is about this same element.) (6 pts total)

a) Give the electron configuration for the element in the format ( $1s^2, 2s^2, 2p^3, \dots$ etc ) (2 pt)

b) Give the valence electron configuration for the element in the same format as above. (2 pt)

c) How many protons \_\_\_\_\_ (1 pt) d) How many valence electrons for the neutral atom \_\_\_\_\_ (1 pt)

8. Match the following to the letters shown. The letters may only be used one time or not at all. (6 pts total, 3 pts each)

- (A) transition metal elements (B) lanthanide, actinide elements (C) main group elements (D) alkali metal elements (E) alkaline earth elements (F) halogens (G) noble gases (H) s block (I) p block (J) d block (K) f block (L) a period (M) a group

Periodic Table of the Elements

1	IA	H	He																	IIA	IIIA	IVA	VA	VIA	VIIA	0
2	Li	Be																	B	C	N	O	F	Ne		
3	Na	Mg	2B	3B	4B	5B	6B	7B	8	9	10	11	12	13	14	15	16	17	18							
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr								
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe								
6	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn								
7	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og								
			Lanthanide Series																			Actinide Series				
			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu										
			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr										



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Name \_\_\_\_\_ (print) Name \_\_\_\_\_ (sign)

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 D) the Law of Conservation of Mass.  
 E) the Law of Multiple Proportions.
- 3) Identify a liquid. \_\_\_\_\_  
 A) definite volume and definite shape  
 B) definite volume and no definite shape  
 C) definite shape and no definite volume  
 D) no definite shape and no definite volume
- 4) A physical change \_\_\_\_\_  
 A) occurs when water is evaporated.  
 B) occurs when glucose is converted into energy within your cells.  
 C) occurs when propane is burned for heat.  
 D) occurs when sugar is heated into caramel.  
 E) occurs when iron rusts.
- 5) Identify a state of matter. \_\_\_\_\_  
 A) melting point  
 B) density  
 C) solid  
 D) volume  
 E) odor
- 6) Water is an example of \_\_\_\_\_  
 A) a compound.  
 B) an element.  
 C) a heterogeneous mixture.  
 D) a homogeneous mixture.

- 7) How many significant figures are in the measurement, 0.003800 g? 7) \_\_\_\_\_  
 A) 4                      B) 5                      C) 6                      D) 7                      E) 8
- 8) The atomic number is equal to 8) \_\_\_\_\_  
 A) the sum of the number of the neutrons and electrons.  
 B) the sum of the number of protons, neutrons, and electrons.  
 C) the sum of the number of protons and neutrons.  
 D) the number of the protons.
- 9) Which of the following represent isotopes? 9) \_\_\_\_\_  
 A:  ${}_{34}^{79}\text{X}$       B:  ${}_{35}^{79}\text{X}$       C:  ${}_{34}^{78}\text{X}$       D:  ${}_{36}^{81}\text{X}$   
 A) B and D  
 B) C and D  
 C) A and D  
 D) A and C  
 E) all of the above
- 10) Which of the following elements is a metal? 10) \_\_\_\_\_  
 A) Br                      B) O                      C) Ag                      D) Sb                      E) He
- 11) Which of the following elements is a halogen? 11) \_\_\_\_\_  
 A) Kr                      B) I                      C) Po                      D) S                      E) Sn
- 12) Identify the cation. 12) \_\_\_\_\_  
 A) Br                      B)  $\text{Sr}^{2+}$                       C) Kr                      D)  $\text{O}^{2-}$                       E)  $\text{I}_2$
- 13) Which of the following elements is in Period 4? 13) \_\_\_\_\_  
 A) Bi                      B) He                      C) Zr                      D) Ag                      E) Ca
- 14) A covalent bond is best described as 14) \_\_\_\_\_  
 A) a bond between a metal and a polyatomic ion.  
 B) a bond between two polyatomic ions.  
 C) the transfer of electrons.  
 D) the sharing of electrons between atoms.  
 E) a bond between a metal and a nonmetal.
- 15) What is the empirical formula for  $\text{Hg}_2(\text{NO}_3)_2$ ? 15) \_\_\_\_\_  
 A)  $\text{Hg}_2\text{NO}_3$   
 B)  $\text{Hg}(\text{NO}_3)_2$   
 C)  $\text{Hg}_2(\text{NO}_3)_2$   
 D)  $\text{HgNO}_3$   
 E)  $\text{Hg}_4(\text{NO}_3)_4$

16) Which of the following exists as a diatomic molecule?

16) \_\_\_\_\_

- A) lithium
- B) phosphorus
- C) krypton
- D) oxygen
- E) carbon

II. Short Answers ( 38 pts)

**Please show work on all questions for partial credit even on questions which do not specify.**

1. Circle the following which is an element (4 pts total, ½ pts each)

Cu          CCl<sub>4</sub>          K Cl          Al          Li Br          BCl<sub>3</sub>          C          Fe

2. Given the following list of chemical formulas, circle all which are ionic (4 pts total, ½ pts each)

Na Cl          CO<sub>2</sub>          Sr<sub>3</sub>P<sub>2</sub>          MgF<sub>2</sub>          SO<sub>2</sub>          CaBr<sub>2</sub>          SF<sub>6</sub>          NO<sub>2</sub>

3. If you have a compound made up of the elements **Be** and **P** (6 pts total)

a) What are the charges on the ions made from those elements (show work) (2 pts)

b) Write the formula for the compound made from those elements. Showing work on how you arrived at the formula. (4 pts)

4. Metric prefixes (4 pts total, 2 pts each)

\_\_\_\_\_ centiliter = 1 liter          \_\_\_\_\_ meter = 1 kilometer



5. How many significant figures is in the following calculation: (show work, # of sig fig for each number or the column) (2 pts for work)

$$(327.02 - 17.100) * 8.3101 = 2575.466192 \text{ (calculator number)}$$

correct # to correct significant figures is \_\_\_\_\_ (2 pts)

6. element symbol. (4 pts total, 2 pts each)

Given the symbol, write out the name, given the name give the symbol of the element.

B \_\_\_\_\_ silicon \_\_\_\_\_

7. For the element Ca answer the following. (The rest of this question is about this same element.) (6 pts total)

a) Give the electron configuration for the element in the format ( $1s^2, 2s^2, 2p^3, \dots$ etc ) (2 pt)

b) Give the valence electron configuration for the element in the same format as above. (2 pt)

c) How many protons \_\_\_\_\_ (1 pt) d) How many valence electrons for the neutral atom \_\_\_\_\_ (1 pt)

8. Match the following to the letters shown. The letters may only be used one time or not at all. (6 pts total, 3 pts each)

- (A) transition metal elements (B) lanthanide, actinide elements (C) main group elements (D) alkali metal elements (E) alkaline earth elements (F) halogens (G) noble gases (H) s block (I) p block (J) d block (K) f block (L) a period (M) a group

Periodic Table of the Elements

1A																	7A	8A	
1	H																	He	
2	Li	Be											B	C	N	O	F	Ne	
3	Na	Mg	3B	4B	5B	6B	7B	8	9	10	11	12	13	14	15	16	17	18	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
6	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
7	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt										Og

Co	Fe	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

III. Long Answer (30 pts) Please show work. If you get the final correct number without showing your work, you will earn zero points.

1. You are electroplating gold (Au) onto a surface and you expect that you will have  $7.98 \times 10^{23}$  atoms of gold on this surface. How much would this many atoms of gold weigh? (Avogadro's number =  $6.022 \times 10^{23}$ ) (15 points)

2. You have confiscated an unknown substance which looks like platinum or silver or stainless steel from criminals . You are the crime scene investigator. Your job is to identify the substance. The substance is metallic and unreactive. In the field you measure the volume as 78.2 cups and its mass is 99.2 pounds. What is its density (density = mass / volume) ? (You will then use a density table in **grams / mL** to identify the substance.) (4 cups = 1 quart, 4 quart = 1 gallon, 1.000 liters = 1.056688 quart, 453.593 grams = 1 pound) (15 points)