Name _____ **Chemistry Final Exam 2014**

Objective: 8.P.1.1 – Atoms and Elements

1. How many **protons** does sodium have?
   a. 1
   b. 11
   c. 12
   d. 23

2. Which of the following is the basis for how elements are **arranged** in the periodic table?
   a. Alphabetical
   b. Number of protons
   c. Masses of atoms
   d. Date of discovery

3. **Write your answer on the blank on the answer sheet.**
   The nucleus of an atom contains which two subparticles, _____ and _____.

4. What makes an atom's charge electrically neutral?
   a. subatomic particles have no charge
   b. atoms contain only neutrons, which have no charge
   c. the number of negative electrons equals the number of positive protons

5. Sodium is an element found in table salt. It contains **11 protons** and **12 neutrons**. How many **electrons** are found in a **neutral atom of sodium**?
   a. 23 electrons
   b. 12 electrons
   c. 11 electrons
   d. 1 electrons

Objective: 8.P.1.1 – Mixtures & Compounds

6. Which of the following is correctly arranged in going from **simplest to most complex**?
   a. Compound → Element → Atom
   b. Atom → Element → Compound
   c. Atom → Compound → Element
   d. Element → Atom → Compound

7. Which pure substance is composed of only one element?
   a. Water
   b. Oxygen
   c. Salt
   d. Carbon Dioxide

8. Which substance is **not** a compound?
   a. Ne
   b. NaCl
   c. CO_2
   d. SiO_2

9.An unknown substance is provided in a science class. Looking at the substance, a student observes *different* colors and *different* sizes of particles *unevenly distributed* throughout the substance. What type of substance is this?

a. Solution
b. Compound
c. Heterogeneous mixture
d. Homogeneous mixture

10.

Substance	Formula
Water	H_20
Table Salt	NaCl
Ammonia	NH_3
Sugar	$C_6H_{12}O_6$
Baking Soda	$NaHCO_3$

According to the table to the **left**, the common household *ammonia* is composed of what <u>two elements</u>?

a. Helium and Nitrogen
b. Neon and Helium
c. Neon and Hydrogen
d. Nitrogen and Hydrogen

Objective: 8.P.1.2 – The Periodic Table

11. How can a scientist, using the periodic table, find an element with **physical and chemical properties** similar to another element?

a. by comparing density
b. by finding its periodic group
c. by comparing malleability
d. by comparing atomic weight

12. Magnesium is used in fireworks because it gives off a **bright light** when it burns. Which element will ***most likely*** produce a similar reaction when burned?

****Hint: Look at your periodic table and identify where Magnesium is on the periodic table.**

a. Sulfur
b. Fluorine
c. Strontium
d. Chromium

13. **Write your answer on the blanks on the answer sheet.** The *least reactive* group on the periodic table is _____because_____.

14. Which elements in the periodic table are *most likely* to combine with other elements to gain or loss an electron to become more stable and full?

a. Group 1 & Group 18
b. Group 2 & Group 17
c. Group 1 & Group 17

15. Based on the periodic table, which of the following **groups of elements should have very similar chemical properties?**

a. Lithium (Li), sodium (Na), potassium (K)
b. Potassium (K), aluminum (Al), neon (Ne)
c. Carbon (C), iodine (I), hydrogen (H)
d. Manganese (Mn), Magnesium (Mg), Molybdenum (Mo)

Objective: 8.P.1.2 – The Periodic Table - Metals, Metalloids and Non-Metals

16. Which element is a **poor** conductor of heat?
    a. F – nonmetal
    b. K - metal
    c. Fe - metal
    d. Ag - metal

17. What *physical property* allows aluminum to be *beaten into thin sheets* of aluminum foil?
    a. It is dense.
    b. It is soluble.
    c. It is malleable.
    d. It is magnetic.

18. The element ***silicon*** is best used of which purpose?
    a. It is a *metal*, which allows a container to keep coffee hot.
    b. It is a *metalloid*, which is a semiconductor in computer chips.
    c. It is a *metal*, which allows it to be made into malleable materials for coins and jewelry.

19. Which is **true of *metals* *when*** compared to nonmetals?
    a. Metals tend to have lower melting points and lower **conductivity** than nonmetals.
    b. Metals tend to have higher melting points and greater **conductivity** than nonmetals.
    c. Metals tend to have higher melting points and lower **conductivity** than nonmetals.

20. Copper wires are covered in *plastic*; this allows us to pick up electrical cords without being electrocuted. What *physical property* of plastic allows this to happen?
    a. Conductivity
    b. Malleability
    c. Ductility
    d. Insulator

Objective: 8.P.1.3 – Physical Changes

21. A beaker with 100 mL of water is placed on a hot plate and heated. The water boils at 100 °C. At what temperature would 90 mL of water boil?
    a. 10 °C
    b. 90 °C
    c. 100 °C
    d. 110 °C

22. This table shows the **specific heat** of four substances.

Substance	Specific Heat (J/Kg * C)
Lead	128
Iron	448
Glass	837
Ice	2,090

Write your answer on the blanks on the answer sheet.
If each substance is exposed to the **same amount of energy** for one-minute, which **substance** will get the **hottest** and why will this substance get the hottest after the one-minute?

*23.Which is the best way to determine if an object is made of **pure silver**?

a. Determine the solubility of the object.
b. Determine the density of the object and compare the known density of pure silver.
c. Compare the mass of the silver object to the mass of apiece if pyres (fake) silver.

24. What is true about solutes and solvents?

a. solvents dissolve in solutes
b. solutes dissolve in solvents

25. Which scenario will most likely cause water, the solvent, to **dissolve more** of a solute?

a. decreasing the temperature of the water
b. increasing the temperature of the water

Objective: 8.P.1.3 - Physical and Chemical Change

26. What are correct four signs that show a *chemical change* has occurred when substances combine to form one or more new substances?

a. Color change, freeze, heat & light, and precipitate
b. Precipitate, color change, heat & light, and release of gas
c. Release of gas, color change, heat & light, and melting

27. Which is an example of a *physical change*?

a. Boiling
b. Burning
c. Rotting
d. Rusting

28. Which is **not** an example of a *chemical change* of a substance?

a. burning coal
b. rusting of metal
c. salt dissolving in water
d. tarnishing (rusting) of silver

29. A lab student places some sodium hydroxide solution into a test tube and adds a drop of phenolphthalein solution to it. Both sodium hydroxide and phenolphthalein are colorless, yet when *mixed together*, the **solution turns pink**. What has occurred?

a. a heterogeneous mixture
b. a chemical change
c. the formation of a solid
d. a physical change

30. Taylor investigated the effects of hydrochloric acid on several solid substances. The results recorded below are her observations of the effect of hydrochloric acid on a sample of calcium carbonate.

- *After placing one drop of HCl on a sample of $CaCO_3$, bubbles formed. Once the bubbles stopped, a clear liquid and a white solid remained on the surface of the sample.*

What type of change occurred to the substances in her investigation?

a. a chemical change
b. a gradual change
c. a physical change
d. a temporary change

Objective: 8.P.1.4 - Law of Conservation of Matter (Mass)

31. Chemical X has a mass of 5 grams, and chemical Y has a mass of 9 grams. If the two chemicals are mixed and complete chemical reaction takes place, what is ***most likely*** the mass of the product?

a. 5 grams
b. 9 grams
c. 14 grams
d. 45 grams

32. After a chemical reaction occurs in an *open test tube*, measurements indicate that the mass of the products remaining in the test tube is *less than the reactants*. What ***most likely*** explains the measurements?

a. A gas was produced.
b. A solid was produced.
c. The salinity of the reactants was high.
d. The temperature of the reactants was low.

33. How does the law of conservation of matter (mass) apply to chemical reactions?

a. Atoms are rearranged, but are neither created nor destroyed.
b. Only a small amount of matter is lost during every reaction.
c. Reactant atoms are destroyed, but product atoms are created.
d. People can use chemical reactions to protect natural resources.

34. The reactants involved in a chemical reaction are shown.

$$H_2Na_2O + H_2O = ?$$

How many H (Hydrogen) atoms must be present in the **product** that forms from this reaction?

a. 1
b. 3
c. 4

35. A scientist combines 30.2 grams of hydrogen with 33.8 grams of calcium and an unknown amount of carbon. The mass of the resulting compound is 65.9 grams. What is the mass of the unknown amount of carbon?

a. 1.9 grams
b. 3.9 grams
c. 64.7 grams
d. 128..9 grams

Name: _____ **Date:** _____

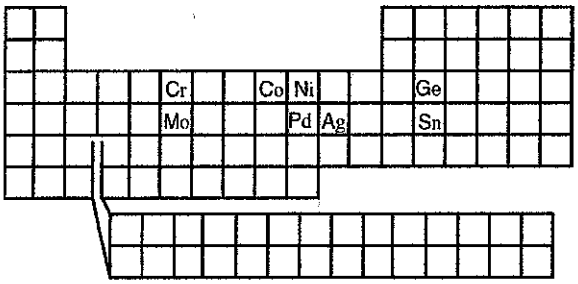
1.

Partial Periodic Table

1																	18
1 H 1.008	2											13	14	15	16	17	2 He 4.003
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80

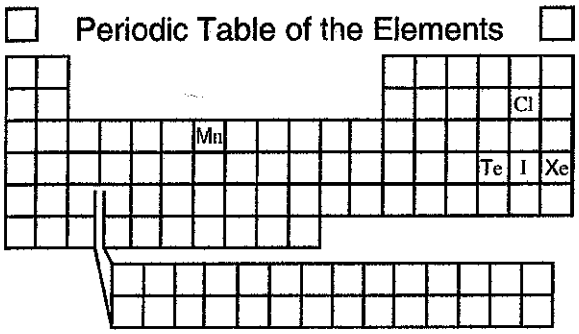
Use the partial periodic table above to compare the atomic structure of carbon (C) to that of sodium (Na). Describe how they are alike and how they are different.

2. ☐ Periodic Table of the Elements ☐



Which of the following ordered pairs of elements shows an increase in atomic number but a decrease in average atomic mass?

A. Ag to Pd B. Co to Ni C. Ge to Sn D. Cr to Mo

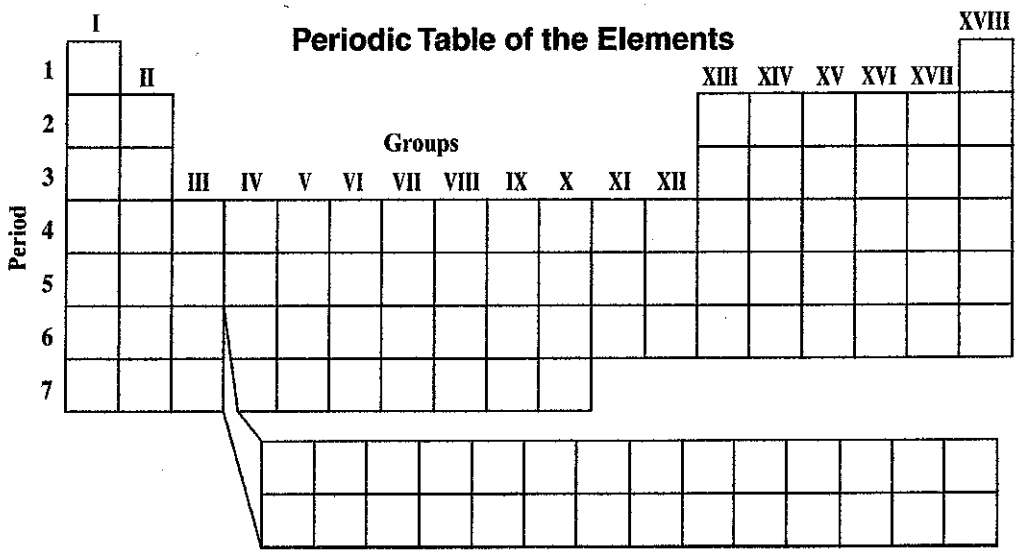
3. 

Iodine would have chemical properties *most* like

A. manganese (Mn). B. tellurium (Te). C. chlorine (Cl). D. xenon (Xe).

4. Oxygen has an atomic number of 8. Which of the following elements would you expect to be **most** similar to oxygen in terms of its chemical properties?

A. Nitrogen (N) B. Fluorine (F) C. Sulfur (S) D. Chlorine (Cl)

5. 

Different elements are *most likely* to react in similar ways when they _____.

A. are members of the same period B. are members of the same group

C. have nearly the same atomic mass D. have the same number of neutrons

6. The pictures below show the position of different elements on the periodic table. Which picture has an X in the locations of the three elements that would be most similar in the way they react?

A.

X		
X		
X		

B.

X	X	X

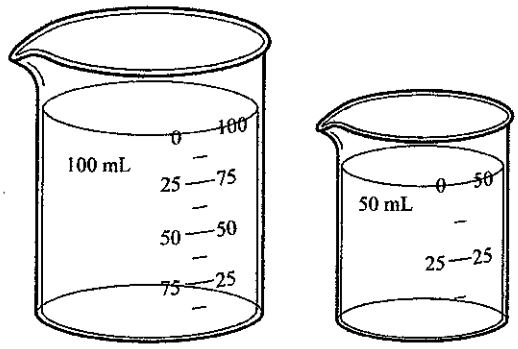
C.

X		
	X	
		X

D.

		X
	X	
X		

7. The two beakers below contain pure water.



Which of the following properties is the same for both of these samples?

A. mass B. weight C. volume D. boiling point

8. The following statements all apply to *one* element:

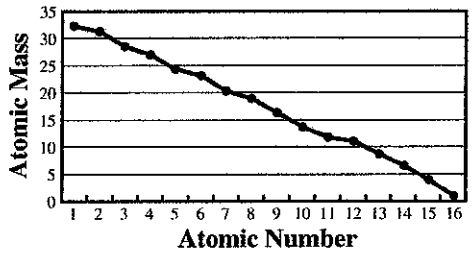
- used by plants in photosynthesis
- found in carbohydrates, proteins, and lipids
- recycled by decay and burning
- required element in all organic molecules

What is this element?

A. carbon B. nitrogen C. phosphorus D. sulfur

9. Which of the following graphs *best* shows the relationship between an element's atomic mass and its atomic number?

A.



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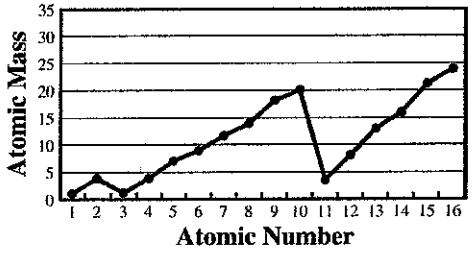
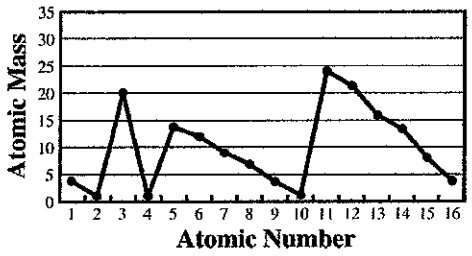
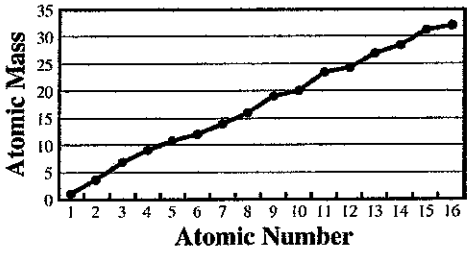


C.



D.



10. Which is an example of a chemical reaction?

A. nails rusting B. glass melting C. sugar dissolving D. alcohol vaporizing

11. Which of the following forms of energy is released or absorbed in *most* chemical reactions?

A. light energy B. electrical energy C. sound energy D. heat energy

12. A balanced chemical equation reflects the idea that the mass of the products

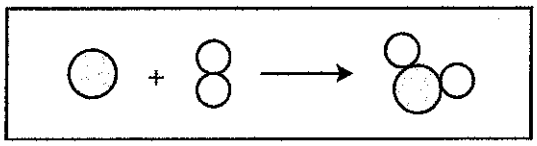
A. is greater than the mass of the reactants.
B. is less than the mass of the reactants.
C. equals the mass of the reactants.
D. is not related to the mass of the reactants.

13. A balanced chemical equation reflects the idea that the mass of the products

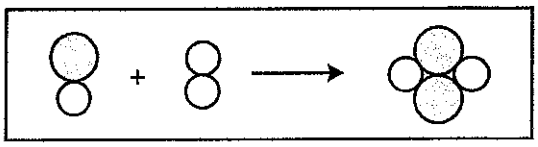
A. is greater than the mass of the reactants.
B. is less than the mass of the reactants.
C. equals the mass of the reactants.
D. is not related to the mass of the reactants.

14. The law of conservation of mass can be demonstrated by a chemical reaction. Which of the following models of a chemical reaction *best* represents the law of conservation of mass?

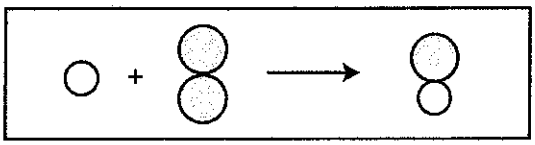
A.



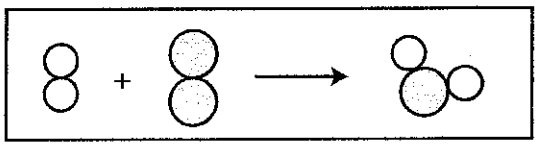
B.



C.



D.



15. Materials combine chemically or physically.

Which materials form a new substance when chemically combined?

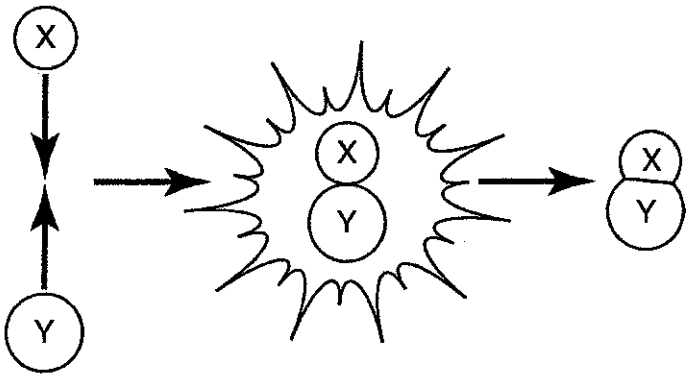
A. salt and pepper

B. water and sugar

C. iron nails and pennies

D. baking soda and vinegar

16. Elements X and Y react to form compound XY.



How is compound XY different from elements X and Y?

A. The mass of compound XY is greater than the combined masses of elements X and Y.

B. The volume of compound XY is less than the combined volumes of elements X and Y.

C. The physical properties of compound XY have changed from those of elements X and Y.

D. The react of compound XY is greater than the reactivity of elements X and Y.

17. The data table below lists some of the properties of matter.

PROPERTIES OF MATTER

	Cellulos	**Sugar**	**Carbon**	**Hydrogen**	**Oxygen**
Color	White	White	Dark	Colorless	Colorless
State of Matter	Solid	Solid	Solid	Gas	Gas
Reactivity	Stable	Stable	Reactive	Reactive	Reactive

How do the properties of the elements compare with the properties of cellulose?

A. The physical and chemical properties of the elements are different from the physical and chemical properties of cellulose.

B. The physical and chemical properties of the elements are the same as the physical and chemical properties of cellulose.

C. The physical properties of the elements and cellulose are different, but their chemical properties are the same.

D. The physical properties of the elements and cellulose are the same, but their chemical properties are different.

Use the information below to answer the following question(s)

Making a Volcano

Students made a model of a volcano using a tray, a small paper cup, clay, baking soda, food coloring, dish soap, and vinegar (acetic acid). First, they placed the paper cup on a large tray and covered the cup with clay to make it look like a volcano. Then, the students placed 10 grams of baking soda into the cup. Next, they added five drops of both food coloring and dish soap to 30 milliliters of vinegar. Finally, the students poured the vinegar mixture into the cup.

Immediately, bubbles and foam erupted from the model volcano. The students observed the model and recorded their observations of the changes in the substances that made the model volcano.

MODEL VOLCANO

18. Which statement *best* describes evidence that a chemical reaction occurred in this investigation?

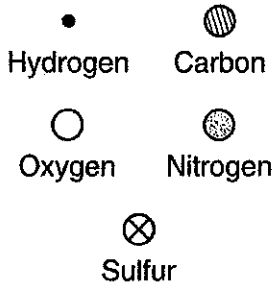
A. The solid mixed with the liquid released a gas.

B. The total mass of the substances remained constant.

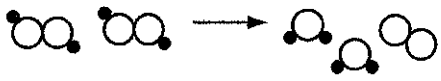
C. The solid mixed with the liquid absorbed heat energy.

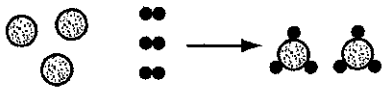
D. The volume of the vinegar and baking soda increased.

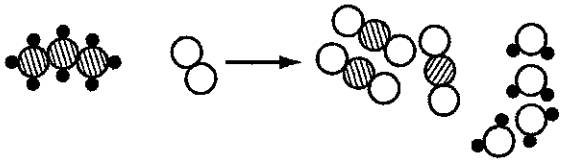
19. Each circle shown below represents a different atom.

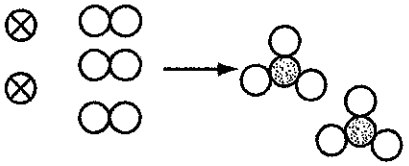


Which diagram illustrates that matter is always conserved during a chemical reaction?

A. 

B. 

C. 

D. 

20. Which of these is an example of a physical change?

A. Melting ice B. Rusting metal C. Baking a cake D. Burning leaves

21. Which *best* explains why the total mass of the product(s) would be less than the total weight of the reactant(s) after a chemical reaction?

A. A physical change occurred.

B. Atoms involved in the reaction lost mass.

C. Precipitates were created in the new solution.

D. Gases were released to the atmosphere.

22. If a chemical reaction such as photosynthesis begins with 6 atoms of carbon (C), how many atoms of carbon (C) should be in the products?

A. 12 atoms of carbon (C)
B. 6 atoms of carbon (C)
C. 3 atoms of carbon (C)
D. 2 atoms of carbon (C)

23. How does a balanced chemical equation satisfy the Law of Conservation of Mass?

A. During a chemical reaction, the total amount of matter stays the same.
B. During a chemical reaction, matter is destroyed.
C. During a chemical reaction, one or more new substances are formed.
D. During a chemical reaction, the total number of atoms increases.

24. Why does a balanced chemical equation support the Law of Conservation of Mass?

A. because the total mass of the products is greater than the mass of the reactants
B. because the total mass of the reactants is less than the mass in the products
C. because the total mass of the reactants equals the total mass of the products

25. Which remains the same during a chemical reaction?

A. the temperature of the elements
B. the total number of atoms
C. the total number of compounds