

# CHEMISTRY QUARTER 1 CUMULATIVE REVIEW

Name/Per.: \_\_\_\_\_

This is a list of ideas & concepts you should be able to do on the semester test & will be covered on the First Quarter Test.

## Unit 1- Atomic Structure and Nuclear Decay

1. Why do scientists believe that hydrogen and helium are the building blocks of all other elements?
2. How does a star produce such enormous amounts of heat and light?
3. How are elements heavier than Fe formed?
4. How do scientists identify which elements are present in the stars?

5.

	Location	Charge	Mass
Electron			
Proton			
Neutron			

6.

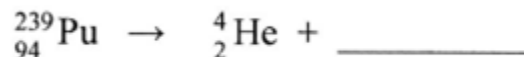
Isotope Name	Isotope Symbol	Protons	Electrons	Neutrons	Mass #	Atomic #
Argon-42						
	$^{136}_{56}\text{Ba}$					
Titanium 48						

7. Boron has two naturally occurring isotopes, boron-10 and boron-11. The relative abundance of boron-10 is 19.9%; the relative abundance of boron-11 is 80.1%. The atomic mass of boron-10 is 10.01 amu and the atomic mass of boron-11 is 11.01 amu. What is the average atomic mass of boron? Show all of your work including the equation.

8.

	Symbol (Greek Letter)	Symbol (Isotope Notation)	Charge	Change in atomic number	Change in mass number
Beta particle					
Alpha particle					

9. Complete the following nuclear reactions:



10. Write the balanced equation for the nuclear reaction described in each of the following processes:

- a. Americium-241 ( $^{241}\text{Am}$ ) undergoes alpha decay (inside a smoke detector)
  
- b. Iodine-131 ( $^{131}\text{I}$ ) undergoes normal beta decay (used in therapy for hyperthyroidism)

11. Match the type of emitted radiation to the minimum amount of shielding required to stop it:

- |                   |                           |
|-------------------|---------------------------|
| A. alpha particle | _____ several lead bricks |
| B. beta particle  | _____ paper               |
| C. gamma ray      | _____ thin piece of lead  |

**Unit 2: The Periodic Table**

1. Name the period 2 halogen \_\_\_\_\_
2. Name the group 13, period 5 element \_\_\_\_\_
3. Name the period 2, alkaline-earth metal \_\_\_\_\_
4. Is U a representative element, transition metal, or inner transition metal? \_\_\_\_\_
5. \_\_\_\_\_

Element	Metal, metalloid, or nonmetal?	Representative or Transition Element?	Group Number
Fe			
Si			
He			
Na			
W			
Al			
Sb			

6.

	Trend Across a Period (L-R)	Why?	Trend Down a Group (top to bottom)	Why?
Atomic Radius				
Electronegativity				

7. Circle the element in each pair that has the highest electronegativity:
  - a. K or Mg
  - b. Mg or S
  - c. F or He
  
8. Circle the element with the largest atomic radius.
  - a. Al or B
  - b. S or O
  - c. Br or Cl

9. Give the **orbital notations (diagrams, configurations)** for these elements.
- Na
  - C
  - Kr
10. Give the complete **ground state electron configuration** for these elements.
- Ne \_\_\_\_\_
  - Pd \_\_\_\_\_
  - At \_\_\_\_\_
11. Give the **noble gas configuration (notation)** for these elements.
- P \_\_\_\_\_
  - Ga \_\_\_\_\_
  - Rb \_\_\_\_\_
12. Looking at the periodic table, how would the electron configurations for the following elements **end**?
- S \_\_\_\_\_
  - Cl \_\_\_\_\_
  - Mg \_\_\_\_\_
  - Xe \_\_\_\_\_
13. What is the octet rule?
14. How many valence electrons do the following elements have?
- Si \_\_\_\_\_
  - Ca \_\_\_\_\_
  - Br \_\_\_\_\_
  - Ar \_\_\_\_\_
15. Draw the electron dot structures for the following elements.
- Arsenic
  - Cesium
  - Boron
  - xenon

### Unit 3: Bonding

- Use electron dot structures to show how nitrogen and calcium form a compound. Include the formula and name of the compound.
- Complete the following statements. Insert the correct numbers into the blanks.
  - Barium has \_\_\_\_\_ valence electrons and will (gain/lose) \_\_\_\_\_ electrons to become stable making it a(n) (cation/anion).
  - Oxygen has \_\_\_\_\_ valence electrons and will (gain/lose) \_\_\_\_\_ electrons to become stable, making it a(n) (cation/anion).
- Write the name or formula for the following:
  - KBr \_\_\_\_\_
  - Calcium chloride \_\_\_\_\_
  - SnCl<sub>2</sub> \_\_\_\_\_
  - Iron (III) sulfide \_\_\_\_\_
  - Sodium iodide \_\_\_\_\_
  - Cs<sub>3</sub>N \_\_\_\_\_
  - Copper (I) sulfate \_\_\_\_\_
  - MnO \_\_\_\_\_

i.  $\text{NH}_4\text{NO}_3$  \_\_\_\_\_

j. Sodium carbonate \_\_\_\_\_

m.  $\text{P}_2\text{O}_5$  \_\_\_\_\_

n.  $\text{CO}_2$  \_\_\_\_\_

k. Aluminum hydroxide \_\_\_\_\_

l.  $\text{Mg}_3(\text{PO}_4)_2$  \_\_\_\_\_

o.  $\text{SO}_3$  \_\_\_\_\_

p.  $\text{CCl}_4$  \_\_\_\_\_

4. Draw the Lewis structure(s) for each of the following:

a.  $\text{C}_2\text{H}_4$

b.  $\text{NI}_3$

c.  $\text{OCl}_2$

5. List the properties of ionic bonds and compounds.

6. List the properties of covalent bonds and compounds.

7. Determine the types of bonds that are present in the following compounds (ionic or covalent):

a. Lead (II) oxide \_\_\_\_\_

d. Copper (I) sulfate \_\_\_\_\_

b. Nitrogen dioxide \_\_\_\_\_

e.  $\text{As}_2\text{O}_5$  \_\_\_\_\_

c.  $\text{NaI}$  \_\_\_\_\_

f. Copper (II) chloride \_\_\_\_\_

### Vocabulary:

*Define the following vocabulary words on a separate sheet of paper and attach it to this sheet.*

*Starred (\*) terms will be found in your Earth Science textbook or your unit 1 notes.*

a. Fusion\*

f. average atomic mass

k. Anion

p. Crystal Lattice

b. Fission\*

g. nuclear reaction

l. Cation

q. Covalent Bond

c. Supernova\*

h. period

m. Ionic bond

r. Molecule

d. atomic number

i. group

n. Polyatomic ion

s. Valence electrons

e. mass number

j. electronegativity

o. Electrolyte

t. VSEPR model