

ACCEL. 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.

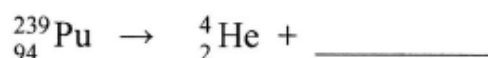
Isotope Name	Isotope Symbol	Protons	Electrons	Neutrons	Mass #	Atomic #
Argon-42						
	$^{136}_{56}\text{Ba}$					
Titanium 48						

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}Am) undergoes alpha decay (inside a smoke detector)

- b. Iodine-131 (^{131}I) undergoes normal beta decay (used in therapy for hyperthyroidism)

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			
Al			

6.

	Trend Across a Period (L-R)	Why?	Trend Down a Group (top to bottom)	Why?
Atomic Radius				
Ionic Radius				
Ionization Energy				
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.
 - a. Na

 - b. C

 - 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 & 4: Bonding

- Be able to *tell and show* how atoms gain and lose electrons to become stable. 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).
- Be able to write formulas and names for binary ionic compounds. Write the name or formula for the following:
 - KBr _____
 - Calcium chloride _____
 - Sodium iodide _____
 - Cs_3N _____
- Be able to write formulas and names for transition metal compounds. Remember the () and Roman numeral in the NAME. Write the name or formula for the following:
 - SnCl_2 _____
 - Iron (III) sulfide _____
 - Copper (I) sulfate _____
 - MnO _____
- Be able to write the formulas and names for compounds containing polyatomic ions. Remember the () when more than one polyatomic ion is needed. Write the name or formula for the following:
 - NH_4NO_3 _____
 - Sodium carbonate _____
 - Aluminum hydroxide _____
 - $\text{Mg}_3(\text{PO}_4)_2$ _____
- Be able to name covalent compounds. Name the following compounds:
 - P_2O_5 _____
 - CO_2 _____
 - SO_3 _____
 - CCl_4 _____
- Be able to draw Lewis structures for covalent molecules. Draw the Lewis structure(s) for each of the following:

a. C_2H_4	b. NI_3	c. OCl_2

8. What is the shape of 7b above? _____
9. What is the shape of 7c above? _____
10. Know the properties of ionic bonds and compounds. List them.
11. Know the properties of covalent bonds and compounds. List them.
12. 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. As ₂ O ₅ | _____ |
| c. NaI | _____ | f. Copper (II) chloride | _____ |
13. What is the main intermolecular force acting on the following molecules?
- | | | | | | |
|--------------------|-------|--------------------|-------|--------------------|-------|
| a. NH ₃ | _____ | b. CH ₄ | _____ | c. SF ₂ | _____ |
|--------------------|-------|--------------------|-------|--------------------|-------|
14. Put the following in order of increasing melting point: F₂, CaCl₂, NH₃, CBr₄ _____

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 |