

Name: _____ Per _____

Unit 2 Review: Honors
Atomic Structure and Electronic Configuration.

This review is Due: _____.

This means I will check your work for completion on this date. You will then need to turn this review packet back in your Table of Contents packet at the end of the unit.

Unit 2 Topics:

- History of Atomic Theory (Important scientists)
- Atomic Configuration
 - How to determine protons, neutrons, electrons and valence electrons for atoms and ions.
 - Isotopes
 - Average atomic mass
- **Bohr Diagrams**
 - Atoms
 - ions
- Properties of Light
 - Types of electromagnetic radiation
 - How to calculate:
 - Wavelength
 - Frequency
 - Energy
- Atomic Spectra
 - Explain the process of electronic transitions
 - Calculations
- Quantum Mechanics
- Electronic Configuration

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1. Briefly describe the experiments performed by these atomic scientists, and list the discovery made by their experiment.

Scientist	Experiment	Discovery	What is missing/incorrect?
Dalton			
Thomson			
Rutherford			
Bohr			

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2. How did Thomson decide that there are electrons and that they are negatively charged?

3. How did Thomson decide that there is a positive charge in the atom, too?

4. How did Rutherford improve Thomson's "Plum Pudding Model" of the atom?

5. Classify each of the following statements as always true (AT), sometimes true (ST) and never true (NT).
 - a. _____ Atoms are electrically neutral when there are the same amounts of protons and electrons.
 - b. _____ The mass of an electron is equal to the mass of a neutron.
 - c. _____ The charge of all protons is the same.
 - d. _____ The atomic number of an element is the sum of the protons and electrons.
 - e. _____ Electrons are located in the nucleus
 - f. _____ An atom of nitrogen has 7 protons and 7 neutrons.
 - g. _____ The masses of atoms are measured in amu's.
 - h. _____ The mass of a nucleus depends on how many protons and neutrons there are.

6. Draw a Bohr diagram of the following isotopes, including how many protons, neutrons, and electrons there are. State whether they are located in the nucleus or electron orbitals. Label everything.

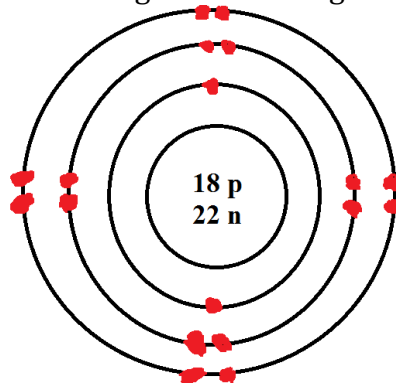
Carbon-12	Carbon-14
Protons ____ Electrons ____ Neutrons ____	Protons ____ Electrons ____ Neutrons ____

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- a. How are these atoms similar?

- b. How are they different?

7. Answer the following questions using the Bohr Diagram below.



- a. On the above diagram, label the nucleus, electron orbitals, protons, neutrons, and electrons.

 - b. What is the Atomic Number of this atom? _____

 - c. How much does the nucleus of this atom weigh? _____

 - d. Is this atom electrically neutral? _____

 - e. What is the identity of the above atom? _____
8. A neutral atom has an atomic number of 16 and a mass number of 35.
- a. It has _____ protons _____ neutrons _____ electrons.

 - b. Why is this atom electrically neutral? _____

 - c. What is the identify of this element? _____
9. Define the following in your own words:
- a. Ground State: _____

 - b. Excited State: _____

 - c. Valence electrons: _____

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- d. Core electrons: _____

- e. Ion: _____

- f. Cation: _____

- g. Anion: _____

- h. Period: _____

- i. Group: _____

10. When observing the Bright Line spectrum of any element, one always sees the exact same bands of light and never any others.

- a. What produces these bright bands of colored light?

- b. How do these bands of colored light show where electrons can and cannot be around the nucleus?

11. What is an orbital?

12. What does Quantum Theory Describe?

13. Write the full electron configurations for these elements at ground state:

- | | |
|-------|-------|
| a. Ge | f. Mg |
| b. C | g. Ba |
| c. Si | h. Be |
| d. Nb | i. He |
| e. Fe | j. Al |

14. How did Dimitri Mendeleev organize the elements into eight columns on his original periodic table?

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15. Why are valence electrons important?

16. What do the elements in a period have in common?

17. Fill out the following chart:

Element	Gain or Lose electrons?	How many electrons?	What charge will the ion have?	Write the symbol with the Charge of the ion formed.	Anion or Cation?
F					
Ca					
S					
N					
Ar					
Li					
B					

18. Bromine has at least two naturally occurring isotopes: Rb-85 (natural abundance 50.69%) and Rb-87. If the average atomic mass is 79.904 what is the abundance of Rb-87?

19. Using the electromagnetic radiation spectrum, arrange the colors of visible light-green, red and blue in order of increasing:

a. Wavelength:

b. Frequency:

c. Energy per photon:

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20. Complete the following table for both ATOMS

Atomic Number	Elemental Name	Symbol	Atomic Mass (amu)	# of Protons	# of Neutrons	# of Electrons
23			51			
	Hassium		269			
		Pm	144			
			257	100		
			4		2	

21. Complete the following table for IONS

Atomic Number	Elemental Name	Ion Formed	Atomic Mass (amu)	# of Protons	# of Neutrons	# of Electrons
38			88			
			14	7		
			127		75	
	Radon		222			

22. How long does it take light to travel 2462 miles (the distance between Los Angeles and New York)? (Report answer in milliseconds)

23. Calculate the frequency and energy of light with a wavelength of 650 nm.

24. Calculate the wavelength and energy of light that has a frequency of 7.14×10^{-14} Hz.

25. Briefly explain the three principles of Orbital Notation: