

\_\_\_\_1. The total number of **protons AND neutrons** in Aluminum 27 is:

- a. 13            b. 14            c. 27

\_\_\_\_2. The number of **protons** in Aluminum 27 is:

- a. 13            b. 14            c. 27

\_\_\_\_3. The number of **electrons** in Aluminum 27 is:

- a. 13            b. 14            c. 27

\_\_\_\_4. The number of **neutrons** in Aluminum 27 is:

- a. 13            b. 14            c. 27

\_\_\_\_5. What is the smallest UNIQUE unit of an element? Remember that subatomic particles are not unique.

- a. a neutron            b. an electron            c. a proton            d. an atom

\_\_\_\_6. What particle gives the nucleus a charge?

- a. protons            b. electrons            c. neutrons            d. protons and neutrons

\_\_\_\_7. Electrons are negatively charged and have the **most** mass of the three sub-atomic particles

- a. True            b. False

\_\_\_\_8. The charge of the neutron is always\_\_\_\_\_

- a. positive            b. negative            c. neutral            d. cannot determine

\_\_\_\_9. An isotope is an atom of a specific element with a varying number of \_\_\_\_\_, so the \_\_\_\_ varies

- a. ions/            mass            b. protons/charge            c. neutrons/mass            d. electrons/charge

\_\_\_\_10. The electron cloud of an atom is... (NOTE: LOW DENSITY WOULD MEAN MOSTLY EMPTY)

- a. negatively charged and has a low density            b. positively charged and has a high density  
c. positively charged and has a low density            d. negatively charged and has a high density



Fill in the blank:

- \_\_\_\_\_ 1. An atom has 12 protons. What is the element?
- \_\_\_\_\_ 2. How many neutrons are in carbon - 14?
- \_\_\_\_\_ 3. Which of the subatomic particles are not found in the nucleus?
- \_\_\_\_\_ 4. What subatomic particles does the nucleus contain?
- \_\_\_\_\_ 5. What subatomic particles have a positive charge?
- \_\_\_\_\_ 6. What is the charge of the electron cloud? ( + or - )
- \_\_\_\_\_ 7. What is the charge on an atom with equal numbers of protons and electrons? ( +, -, or 0 )
- \_\_\_\_\_ 8. The mass of the atom is in the nucleus. Which subatomic particles determine mass?
- \_\_\_\_\_ 9. What subatomic particles do you expect to find in energy levels outside of the nucleus?
- \_\_\_\_\_ 10. What is the center of the atom called?
- \_\_\_\_\_ 11. What subatomic particles are found in the center of the atom?
- \_\_\_\_\_ 12. Which subatomic particles are most involved in bonding with other atoms?  
hint: would these be on the outside, or the inside of atom?
- \_\_\_\_\_ 13. What subatomic particles have no charge?
- \_\_\_\_\_ 14. What subatomic particles give the nucleus a charge?
- \_\_\_\_\_ 15. What is the charge on a proton? ( + or - )
- \_\_\_\_\_ 16. What is the charge on an electron? ( + or - )

BEFORE BEGINNING THIS PAGE..... READ THIS:

Atomic number = number of protons. ALWAYS. If the atom is neutral (no charge) the electrons are equal to the protons. If there is a positive charge, the atom has lost electrons, so the charge becomes positive. If there is a negative charge, the atom has gained electrons, so the charge is negative.

Protons + Neutrons = Mass number

Complete the following table ASSUME THAT THERE IS NO CHARGE FOR THESE ELEMENTS

Element Symbol	Atomic Number	Mass Number	# p <sup>+</sup>	#e <sup>-</sup>	#n <sup>0</sup>	Hyphen Notation
						potassium-39
				82	125	
	13	27				

Correctly fill in the Boxes!

NOTE THAT THERE ARE CHARGES for these elements (ions)

Element Symbol	Atomic Number	Mass Number	# p <sup>+</sup>	#e <sup>-</sup>	#n <sup>0</sup>	Hyphen Notation	Charge
				10		Aluminum-28	+3
			8		17		-2
	56	140					+2
	17				20		-1

## The Electron Cloud Section

1. Which is the correct sequence in which the following sublevels will fill?

- a. 1s, 2s, 3s, 4s, 2p, 3p, 4p, 3d  
b. 1s, 2s, 2p, 3s, 3p, 3d, 4s, 4p  
c. 1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p  
d. 1s, 2s, 2p, 3s, 3p, 4s, 4p, 3d

2. Which is the correct sequence in which the following sublevels will fill?

- a. 4p, 4d, 4f, 5s, 5p, 5d, 5f, 6s, 6p, 6d, 7s  
b. 4p, 5s, 4d, 5p, 6s, 4f, 5d, 6p, 7s, 5f, 6d  
c. 5s, 6s, 7s, 4p, 5p, 6p, 4d, 5d, 6d, 4f, 5f  
d. 4p, 5s, 4d, 5p, 6s, 5d, 6p, 4f, 7s, 6d, 5f

3. Which of the following has an invalid sublevel designation?

- a. 7s                      b. 3p                      c. 3f                      d. 5d                      e. 4f

4. Orbitals are \_\_\_\_\_ of space around the nucleus where a/an \_\_\_\_\_ is likely to be located.

- a. paths, electron                      b. regions, electron                      c. path, neutron                      d. regions, neutron

5. What is the maximum number of electrons that can exist in any p **sublevel**.

- a. 1                      b. 2                      c. 3                      d. 4                      e. 6

6. What is the maximum number of electrons that can exist in any d **sublevel**.

- a. 1                      b. 2                      c. 6                      d. 10                      e. 14

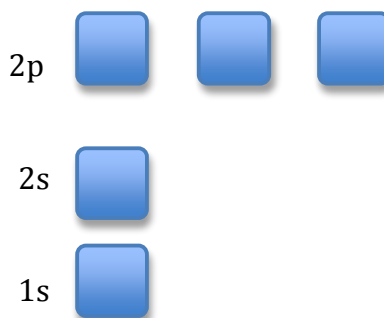
7. Electrons that occupy the same orbital must have...

- a. the same spin      b. the opposite spin      c. no spin at all      d. there cannot be two electrons in one orbital

8. In the orbital diagram for nitrogen, how many electrons are unpaired in the 2p sublevel?

- a. 0                      b. 1                      c. 2                      d. 3                      e. 4

You will need to draw the arrows



9. What sublevels are present in the third energy level?

- a) s only      b) s and p only      c) s, p, and d only      d) s, p, d, and f only

10. How many **orbitals** are present in any p sublevel?

- a. 3                      b. 5                      c. 6                      d. 7                      e. 10

11. When there is an option, will electrons pair up in orbitals, or will they go in one at a time until all are occupied?

- a. pair up first                      b. fill all orbitals with one electron before pairing

12. How many electrons are in the valence (outer) shell of oxygen?

- a. 2              b. 4              c. 6              d. 8

13. What is the coefficient of the highest energy level in As?

- a. 1              b. 2              c. 3              d. 4              e. 5

14. Which subatomic particles are transferred from one atom to another during the formation of an ionic compound?

- a. protons              b. electrons              c. neutrons

#15-18. Matching

- |                |                       |
|----------------|-----------------------|
| ___1. d- block | a. contains vanadium  |
| ___2. f-block  | b. contains lead      |
| ___3. s- block | c. contains Magnesium |
| ___4. p-block  | d. contains Uranium   |

19-20. Arrange the following sublevels in order of increasing energy (Place 1 in the blank for the lowest energy and 8 for the highest energy).

- \_\_\_3d    \_\_\_2s    \_\_\_5p    \_\_\_4f    \_\_\_6p    \_\_\_5s    \_\_\_5f    \_\_\_6d

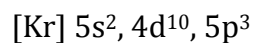
21. Write the complete electron configuration for Chlorine.

22. How many electrons are in the outer shell of Chlorine?

23. Fill the orbital diagram for Br. You can use circles or draw boxes.

24. How many electrons are in the outer shell of Bromine?

25. Which element's configuration is shown below?



26. Draw dot diagrams (valence shell only) for the following elements.

N

Al

27. How many electrons are in all of the **p sublevels** of Ge?