

Name: _____

Date: _____

Atomic Structure

Homework Unit 13 - Topic 1

Properties of Sub-Atomic Particles

Particle	Symbol (Table O)	Electrical Charge	Mass (amu)	Location in atom
Electron				
Proton				
Neutron				

Rutherford and the famous _____ Experiment:

The two BIG discoveries:

1. An atom has a nucleus that is (**small or large**) and (**dense or not so dense**).
2. An atom is composed mostly of (**empty space or dense filling**).

Isotopes: Atoms that have the same (mass or atomic) number, but different (**mass or atomic**) numbers. Said another way, isotopes have the same number of (**protons or neutrons**), but different numbers of (**protons or neutrons**).

(T/F) _____ If two atoms are isotopes of each other, they MUST be the same type of element.

Name	# protons	# neutrons	Mass #	Atomic Symbol	# electrons	# valence electrons	Lewis dot diagram
Carbon-12							
Carbon-13							
Carbon-14							
Lithium-7							
Thalium-201							
Lead-208							

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1. What is the total number of protons in the nucleus of an F^- ion?

1. 8
2. 9
3. 10
4. 11

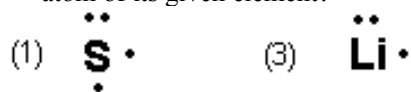
2. Which subatomic particle has no charge?

1. proton
2. ion
3. neutron
4. electron

3. What is the total number of electrons present in an atom of ${}_{27}^{59}\text{Co}$?

1. 27
2. 32
3. 59
4. 86

4. Which electron-dot symbol correctly represents an atom of its given element?



5. As a Ca atom undergoes oxidation to Ca^{2+} , its number of electrons

1. decreases and its radius decreases
2. increases and its radius decreases
3. decreases and its radius increases
4. increases and its radius increases

6. Which statement best describes an electron?

1. It has a smaller mass than a proton and a negative charge.
2. It has a smaller mass than a proton and a positive charge.
3. It has a greater mass than a proton and a negative charge.
4. It has a greater mass than a proton and a positive charge.

7. Which particle has the same electron configuration as a potassium ion, K^{+1} ?

1. fluoride ion
2. sodium ion
3. neon atom
4. argon atom

8. The atomic number of an atom is always equal to the number of its

1. protons, only
2. neutrons, only
3. protons plus neutrons
4. protons plus electrons

9. Which species contains only 12 total particles in its nucleus?

1. ${}_{6}^{12}\text{C}$
2. ${}_{24}^{52}\text{Cr}$
3. ${}_{12}^{24}\text{Mg}$
4. ${}_{11}^{23}\text{Na}$

10. How many electrons are there if an ion has 12 protons and a charge of +2?

1. 12
2. 14
3. 10
4. 8

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11. What is the total number of neutrons in an atom of an element that has a mass number of 19 and an atomic number of 9?
1. 9
 2. 10
 3. 19
 4. 28
12. What is the nuclear charge on the *nucleus* of a carbon-12 atom?
1. zero
 2. +6
 3. -6
 4. +12
13. The nucleus of an atom of K-42 contains
1. 19 protons and 23 neutrons
 2. 19 protons and 42 neutrons
 3. 20 protons and 19 neutrons
 4. 23 protons and 19 neutrons
14. Which symbol represents an isotope of carbon?
1. ${}^6_4\text{X}$
 2. ${}^{12}_5\text{X}$
 3. ${}^{13}_6\text{X}$
 4. ${}^{14}_7\text{X}$
15. An atom of carbon-14 contains
1. 8 protons, 6 neutrons and 6 electrons
 2. 6 protons, 6 neutrons and 8 electrons
 3. 6 protons, 8 neutrons and 8 electrons
 4. 6 protons, 8 neutrons and 6 electrons
16. Which atoms contain the same number of neutrons?
- (1) ${}^1_1\text{H}$ and ${}^3_2\text{He}$
 - (2) ${}^2_1\text{H}$ and ${}^4_2\text{He}$
 - (3) ${}^3_1\text{H}$ and ${}^3_2\text{He}$
 - (4) ${}^3_1\text{H}$ and ${}^4_2\text{He}$
17. How many protons are in the nucleus of an atom of beryllium?
1. 5
 2. 2
 3. 9
 4. 4
18. The total number of electrons in a neutral atom of every element is always equal to the atom's
1. mass number
 2. number of neutrons
 3. number of protons
 4. number of nucleons
19. What is the total number of electrons in a Cu^{+1} ion?
1. 28
 2. 27
 3. 30
 4. 36
20. In an experiment, alpha particles were used to bombard gold foil. As a result of this experiment, the conclusion was made that the nucleus of an atom is
1. smaller than the atom and positively charged
 2. smaller than the atom and negatively charged
 3. larger than the atom and positively charged
 4. larger than the atom and negatively charged
21. An experiment using alpha particles to bombard a thin sheet of gold foil indicated that most of the volume of the atoms in the foil is taken up by
1. electrons
 2. protons
 3. neutrons
 4. empty space
22. The region that is the "most probable location of an electron" in an atom is called
1. the nucleus
 2. an orbital
 3. the excited state
 4. an ion