

**Atomic Structure Test 2023**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. How many electrons are in the outermost energy level of a calcium atom?

- A. 1      B. 2      C. 6      D. 8

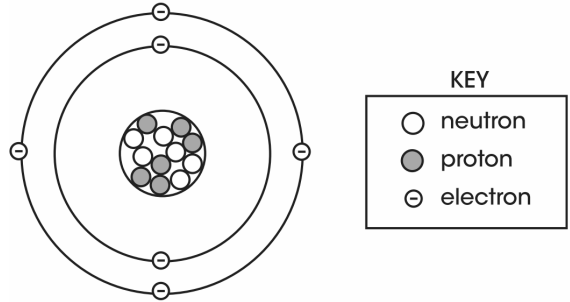
2.  Periodic Table of the Elements

Which of the following elements has the same Lewis dot structure as silicon?

- A. germanium (Ge)      B. aluminum (Al)  
 C. arsenic (As)      D. gallium (Ga)

3. Use the graphic to answer the following question.

**Shell Model**



Which element does the shell model represent?

- A. 

6
<b>C</b>
Carbon
12.0107

 B. 

9
<b>F</b>
Fluorine
18.9984
- C. 

12
<b>Mg</b>
Magnesium
24.3050

 D. 

11
<b>Na</b>
Sodium
22.9898

4. An atom has 29 protons, 29 electrons, and 35 neutrons. What is the mass number of the atom?

- A. 29      B. 35      C. 64      D. 93

5. How many protons are in an atom of bromine?

- A. 115      B. 80      C. 45      D. 35

6. According to the periodic table, the neutral atom of what element has 4 protons, 5 neutrons, and 4 electrons?

- A. beryllium                      B. boron  
C. fluorine                        D. aluminum

7. Which of the following is the same for both hydrogen and potassium?

- A. atomic mass  
B. total mass of neutrons  
C. number of valence electrons  
D. number of filled energy levels

8. What do the elements sulfur (S), nitrogen (N), phosphorus (P), and bromine (Br) have in common?

- A. They are noble (inert) gases.  
B. They are nonmetals.  
C. They have the same thermal conductivity.  
D. They have the same number of protons.

9. The smallest particle of any element that still has the properties of that element is called

- A. an atom.                        B. a compound.  
C. a solution.                      D. a mixture.

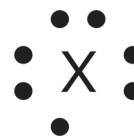
10. Which of the following atoms has six valence electrons?

- A. magnesium (Mg)    B. silicon (Si)  
C. sulfur (S)                D. argon (Ar)

11. Which of the following elements is classified as a metal?

- A. bromine                        B. helium  
C. sulfur                            D. calcium

12. This is an electron dot diagram:



Which element is represented?

- A. boron (B)                      B. phosphorus (P)  
C. sulfur (S)                      D. bromine (Br)

13. How many electrons are found in aluminum?

- A. 3                      B. 13                      C. 14                      D. 27

14. Which distinguishes an atom of one element from an atom of a different element?

- A. the number of protons  
B. the number of neutrons  
C. the number of electrons  
D. the number of neutrons and protons

15. Which of the following elements is a metalloid?

- A. magnesium                      B. silicon  
C. phosphorus                      D. cobalt

16. Which of the following subatomic particles can be found inside the nucleus of an atom?

- A. electrons only  
B. neutrons only  
C. protons and neutrons  
D. protons, neutrons, and electrons

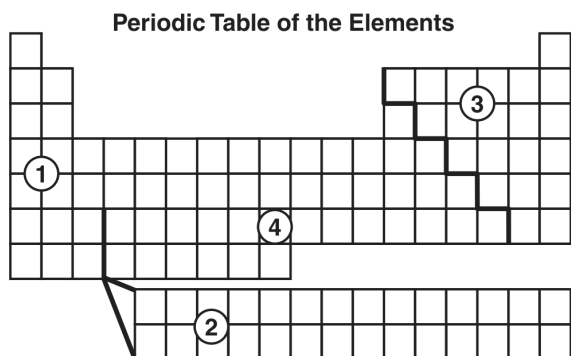
17. Which accounts for *most* of the mass of an atom?

- A. electrons
- B. protons
- C. neutrons and protons
- D. electrons and neutrons

18. Which of the following comparisons correctly describes subatomic particles?

- A. An electron has a negative charge and a mass larger than the mass of a proton.
- B. A neutron has a negative charge and a mass smaller than the mass of a proton.
- C. A neutron has a neutral charge and a mass larger than the mass of an electron.
- D. A proton has a positive charge and a mass smaller than the mass of an electron.

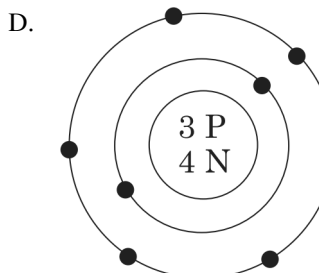
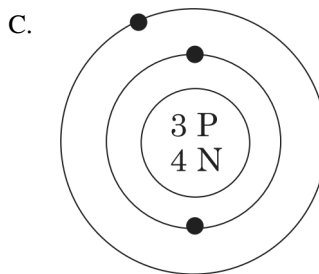
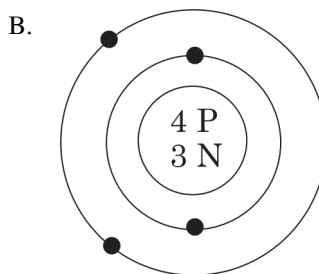
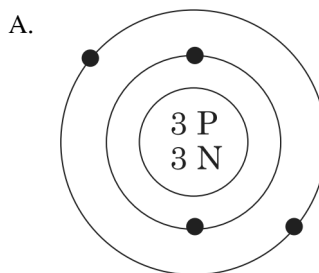
19. A diagram of the periodic table of the elements is shown below.



In which region of the table would nonmetals be found?

- A. 1      B. 2      C. 3      D. 4

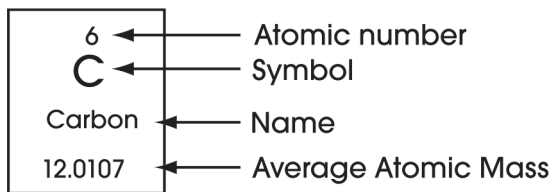
20. Which drawing *best* represents an atom of lithium?



21. Which *best* represents how electrons are arranged in the energy levels of a carbon atom?

- A. first energy level = 1 electrons  
second energy level = 5 electrons
- B. first energy level = 2 electrons  
second energy level = 4 electrons
- C. first energy level = 3 electrons  
second energy level = 3 electrons
- D. first energy level = 4 electrons  
second energy level = 2 electrons

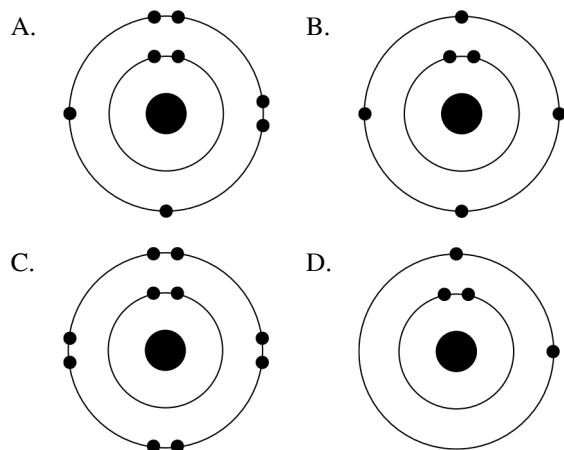
22. Use the diagram to answer the following question.



The atomic number of carbon is 6, which means that carbon atoms always have 6

- A. ions.
- B. protons.
- C. neutrons.
- D. valence electrons.

23. An atom with which atomic diagram has chemical properties *most similar* to calcium?



24. Which of the following *best* describes an atom?

- A. protons and electrons grouped together in a random pattern
- B. protons and electrons grouped together in an alternating pattern
- C. a core of protons and neutrons surrounded by electrons
- D. a core of electrons and neutrons surrounded by protons

25. Which of the following elements is a nonmetal?

- A. fluorine
- B. copper
- C. calcium
- D. sodium