

## Chemistry Review Atomic Concepts Quiz

\_\_\_\_\_ 1. Which phrase describes an atom?

- A) a negatively charged nucleus surrounded by positively charged protons
- B) a negatively charged nucleus surrounded by positively charged electrons
- C) a positively charged nucleus surrounded by negatively charged protons
- D) a positively charged nucleus surrounded by negatively charged electrons

\_\_\_\_\_ 2. Which part of a helium atom is positively charged?

- A) electron                      B) neutron
- C) nucleus                      D) orbital

\_\_\_\_\_ 3. Which subatomic particles are located in the nucleus of a carbon atom?

- A) protons, only
- B) neutrons, only
- C) protons and neutrons
- D) protons and electron

\_\_\_\_\_ 4. Which two particles have opposite charges?

- A) an electron and a neutron
- B) an electron and a proton
- C) a proton and a neutron
- D) a proton and a positron

\_\_\_\_\_ 5. Which subatomic particle has a negative charge?

- A) proton                      B) electron
- C) neutron                      D) positron

\_\_\_\_\_ 6. Which statement concerning elements is true?

- A) Different elements must have different numbers of isotopes.
- B) Different elements must have different numbers of neutrons.
- C) All atoms of a given element must have the same mass number.
- D) All atoms of a given element must have the same atomic number.

\_\_\_\_\_ 7. Every chlorine atom has

- A) 7 electrons
- B) 17 neutrons
- C) a mass number of 35
- D) an atomic number of 17

\_\_\_\_\_ 8. In an atom of argon-40, the number of protons

- A) equals the number of electrons
- B) equals the number of neutrons
- C) is less than the number of electrons
- D) is greater than the number of electrons

\_\_\_\_\_ 9. A sample composed only of atoms having the same atomic number is classified as

- A) a compound                      B) a solution
- C) a element                      D) an isomer

\_\_\_\_\_ 10. What is the total number of electrons in a neutral atom of fluorine?

- A) 9      B) 10      C) 19      D) 28

\_\_\_\_\_ 11. An atom of  ${}^{40}_{18}\text{Ar}$  has a nucleus that contains a total of

- A) 18 electrons                      B) 18 protons
- C) 18 neutrons                      D) 18 nucleons

\_\_\_\_\_ 12. One atomic mass unit (1 amu) is equal to the mass of a carbon-12 atom multiplied by the quantity

- A) 12
- B)  $\frac{1}{12}$
- C) 1836
- D)  $\frac{1}{1836}$

\_\_\_\_\_ 13. The total number of protons, electrons, and neutrons in each of four different atoms are shown in the table below.

**Subatomic Particles in Four Different Atoms**

Atom	Total Number of Protons	Total Number of Electrons	Total Number of Neutrons
A	6	6	7
D	6	6	8
X	7	7	8
Z	8	8	9

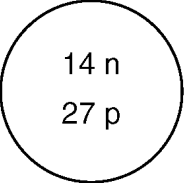
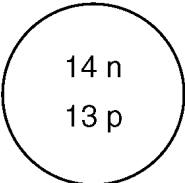
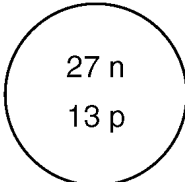
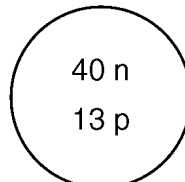
Which two atoms are isotopes of the same element?

- A) *A* and *D*                      B) *A* and *Z*
- C) *X* and *D*                      D) *X* and *Z*

14. Atoms of  $^{16}\text{O}$ ,  $^{17}\text{O}$ , and  $^{18}\text{O}$  have the same number of

- A) neutrons, but a different number of protons
- B) protons, but a different number of neutrons
- C) protons, but a different number of electrons
- D) electrons, but a different number of protons

15. Which diagram represents the nucleus of an atom of  $^{27}_{13}\text{Al}$ ?

- A)  B) 
- C)  D) 

16. The atomic masses and the natural abundances of the two naturally occurring isotopes of lithium are shown in the table below.

**Lithium Isotopes**

Isotope	Atomic Mass (u)	Natural Abundance (%)
Li-6	6.02	7.5
Li-7	7.02	92.5

Which numerical setup can be used to determine the atomic mass of lithium?

- A)  $(0.075)(6.02 \text{ u}) + (0.925)(7.02 \text{ u})$
- B)  $(0.925)(6.02 \text{ u}) + (0.075)(7.02 \text{ u})$
- C)  $(7.5)(6.02 \text{ u}) + (92.5)(7.02 \text{ u})$
- D)  $(92.5)(6.02 \text{ u}) + (7.5)(7.02 \text{ u})$

17. Which value of an element is calculated using both the mass and the relative abundance of each of the naturally occurring isotopes of this element?

- A) atomic number
- B) atomic mass
- C) half-life
- D) molar volume

18. A 100.00-gram sample of naturally occurring boron contains 19.78 grams of boron-10 (atomic mass = 10.01 atomic mass units) and 80.22 grams of boron-11 (atomic mass = 11.01 atomic mass units). Which numerical setup can be used to determine the atomic mass of naturally occurring boron?

- A)  $(0.1978)(10.01) + (0.8022)(11.01)$
- B)  $(0.8022)(10.01) + (0.1978)(11.01)$
- C)  $(0.1978)(10.01)/(0.8022)(11.01)$
- D)  $(0.8022)(10.01)/(0.1978)(11.01)$

19. Hydrogen has three isotopes with mass numbers of 1, 2, and 3 and has an average atomic mass of 1.00794 amu. This information indicates that

- A) equal numbers of each isotope are present
- B) more isotopes have an atomic mass of 2 or 3 than of 1
- C) more isotopes have an atomic mass of 1 than of 2 or 3
- D) isotopes have only an atomic mass of 1

---

Base your answers to questions **20** and **21** on the information below

The element boron, a trace element in Earth's crust, is found in foods produced from plants. Boron has only two naturally occurring stable isotopes, boron-10 and boron-11.

20. State, in terms of subatomic particles, *one* difference between the nucleus of a carbon-11 atom and the nucleus of a boron-11 atom.

---

---

---

21. Write an isotopic notation of the heavier isotope of the element boron. Your response must include the atomic number, the mass number, and the symbol of this isotope.

---

---

---

22. Base your answer to the following question on the information below.

Carbon has three naturally occurring isotopes, C-12, C-13, and C-14. Diamond and graphite are familiar forms of solid carbon. Diamond is one of the hardest substances known, while graphite is a very soft substance. Diamond has a rigid network of bonded atoms. Graphite has atoms bonded in thin layers that are held together by weak forces.

Recent experiments have produced new forms of solid carbon called fullerenes. One fullerene, C<sub>60</sub>, is a spherical, cagelike molecule of carbon.

Determine *both* the total number of protons and the total number of neutrons in an atom of the naturally occurring carbon isotope with the largest mass number.

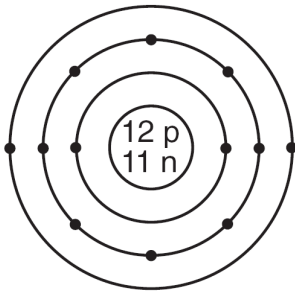
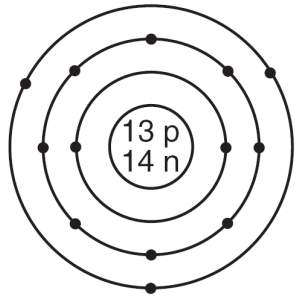
---

---

---

23. Base your answer to the following question on the information below.

### Atomic Diagrams of Magnesium and Aluminum

Key	Element	Lewis Electron-Dot Diagram	Electron-Shell Diagram
• = electron	magnesium	Mg:	
	aluminum	Al:	

Determine the mass number of the magnesium atom represented by the electron-shell diagram.

---

---

---

Base your answers to questions 24 and 25 on the information below.

The accepted values for the atomic mass and percent natural abundance of each naturally occurring isotope of silicon are given in the data table below.

#### Naturally Occuring Isotopes of Silicon

Isotope	Atomic Mass (atomic mass unit)	Percent Natural Abundance (%)
Si – 28	27.98	92.22
Si – 29	28.98	4.69
Si – 30	29.97	3.09

24. Show a correct numerical setup for calculating the atomic mass of Si.

---

---

---

25. Determine the total number of neutrons in an atom of Si-29.

---

---

---