

Atomic Structure

1. a) For the ion ${}_{19}^{39}\text{K}^+$, state how many electrons, how many protons, and how many neutrons are present? _____

b) Which of these particles has the smallest mass?

2. An atom has a net charge of -1. it has 18 electrons and 20 neutrons. Give a) its isotopic symbol b) its atomic number c) the charge on its nucleus d) the number of protons.

a) _____

b) _____

c) _____

d) _____

3. What is the number of electrons in ${}_{37}^{87}\text{Rb}^+$? _____

4. Determine the number of protons, electrons, and neutrons in ${}_{35}^{80}\text{Br}^-$ and ${}_{34}^{79}\text{Se}$? _____

5. Complete the following table.

Symbol	Atomic number	Mass number	# of protons	# of electrons	# of neutrons	Net charge
${}^{90}\text{Sr}^{+2}$			38			
${}^{23}\text{Na}$	11			10	12	
${}^{80}\text{Br}^-$	35	82				1-

6. Complete the following table.

Isotopic Symbol	# of protons	# of neutrons	Atomic mass#
^{13}C	6	7	
Cl	17	18	
Fe	26		56
H	1		3
Sn		70	120

7. Which of the following statements is wrong for structure of an atom?

- A) Protons and neutrons are in the center.
- B) Electrons are moving around the nucleus.
- C) Electrons are negatively charged particle.
- D) Neutrons are positively charged particles.
- E) Mass of one proton is equal to mass of one neutron.

8. Which of the following statements is (are) true for structure of an atom?

- I. Volume of a nucleus is smaller than volume of its atom.
- II. The atomic mass number is the sum of proton and neutron numbers.
- III. The atomic number is the sum of protons and electrons.

- A) I B) II C) III D) I , II E) I, II , III

9. 1) Proton number 2) Neutron number 3) Chemical properties 4) Physical properties

Which of the above is (are) different for isotopes?

- A) II B) III C) I , IV D) II , III E) II , IV

10. If X^{+2} has 28 electrons and 35 neutrons, what is the atomic mass number of X?

- A) 68 B) 67 C) 65 D) 63 E) 60

11. If atomic mass number of ${}_{24}\text{X}$ is 51, what is the number of neutrons of X?

- A) 27 B) 24 C) 51 D) 75 E) 40

12. If X^{+2} has 28 electrons and 35 neutrons, what is the atomic mass number of X?

- A) 68 B) 67 C) 65 D) 63 E) 60

13. If atomic mass number of ${}_{24}X$ is 51, what is the number of neutrons of X?

- A) 27 B) 24 C) 51 D) 75 E) 40

14) What is the atomic mass number of ${}^{236}_{92}U$?

- a) 92 b) 144 c) 236 d) 328

15) What is the neutron number of ${}^{236}_{92}U$?

- a) 92 b) 144 c) 236 d) 328

16. The element F has 10 neutrons and a mass number = 19. How many electrons are in its outermost shell?

- A) 10 B) 3 C) 9 D) 7 E) cannot tell from the information given

17. Which one is a stable isotope of ${}_{17}^{35}Cl$.

- A) ${}_{17}^{34}X$ B) ${}_{18}^{33}X$ C) ${}_{19}^{37}X$ D) ${}_{20}^{36}X$

18. The most common form of iron has 26 protons and 30 neutrons in its nucleus. State its atomic number, atomic mass, and number of electrons if it's electrically neutral.

Atomic number: _____ Atomic mass: _____ # of electrons: _____

19. Consider the following three atoms: Atom 1 has 7 protons and 8 neutrons; atom 2 has 8 protons and 7 neutrons; atom 3 has 8 protons and 8 neutrons. Which two are *isotopes* of the same element?

20. Consider fluorine atoms with 9 protons and 10 neutrons. What are the atomic number and atomic mass of this fluorine? Suppose we could add a proton to this fluorine nucleus. Would the result still be fluorine? Explain. What if we added a neutron to the fluorine nucleus?

Atomic number: _____ Atomic mass: _____

21. How many neutrons are in the nucleus of an atom of tungsten-184 which has an atomic number of 74?

of neutrons: _____

22. Which of the following combinations of particles represents an ion of net charge -1 and of mass number 82?

- (A) 46 neutrons, 35 protons, 36 electrons (B) 46 neutrons, 36 protons, 35 electrons
(C) 46 neutrons, 36 protons, 36 electrons (D) 47 neutrons, 35 protons, 35 electrons
(E) 47 neutrons, 35 protons, 36 electrons

23. One species of element M has an atomic number of 10 and a mass number of 20; one species of element N has an atomic number of 11 and a mass number of 20. Which of the following statements about these two species is true?

- (A) They are isotopes. (B) They are isomers.
(C) They are isoelectronic (D) They contain the same number of neutrons in their atoms.
(E) They contain the same total number of protons plus neutrons in their atoms.

24. A neutral atom has an atomic number of 30 and a mass number of 62, the atom must contain:

- (A) 92 neutrons (B) 62 electrons
(C) 29 neutrons (D) 30 electrons

25. Atom X has 12 protons, 12 electrons, and 13 neutrons. Atom Y has 10 protons, 10 electrons, and 15 neutrons. It can therefore be concluded that:

- (A) atoms X and Y are isotopes. (B) atom X is more massive than atom Y.
(C) atoms X and Y have the same mass number. (D) atoms X and Y have the same atomic number.

26. A neutral atom which has 42 electrons and a mass number of 93 has

- (A) an atomic number of 51. (B) a nucleus containing 51 neutrons.
(C) a nucleus containing 40 neutrons. (D) a nucleus containing 51 protons.

27. A sodium ion, Na⁺, contains the same number of electrons as

- (A) a sodium atom, Na. (B) a magnesium atom, Mg.
(C) a potassium ion, K⁺. (D) a neon atom, Ne.