

CHEM 1305 - Chapter 04 - Notes

Define the following terms; explain the following concepts, and answer the following questions:

- 1) The four most abundant elements on/in Earth, and their approximate percentages. are:
 - a) oxygen (50%)
 - b) silicon (25%)
 - c) aluminum (7.5%)
 - d) iron (5%)

- 2) The number of elements that occur naturally is 88.

- 3) State the five main ideas of DALTON'S ATOMIC THEORY:
 - a) Elements are made of small particles called ATOMS
 - b) All atoms of a given element are IDENTICAL
 - c) Atoms are unique to each element (different elements are made of different atoms)
 - d) Atoms of one kind can combine with elements of another to form COMPOUNDS. (A compound only has one formula--it has the same relative number and types of atoms)
 - e) Atoms are indivisible in chemical processes (they don't become something else)

- 4) Write the formula for the following compounds, listing the elements in the order given:
 - a) two hydrogen and two oxygen atoms: H₂O₂
 - b) two atoms of hydrogen, one atom of sulfur, and four atoms of oxygen: H₂SO₄

- 5) The three key components of an atom are:
 - a) Protons
 - b) Neutrons
 - c) Electrons

- 6) What is the name of the scientist who . . .
 - a) showed that the atoms of any element can be made to emit tiny negative particles, which later became known as 'electrons.' J. J. Thompson

 - b) using gold foil, showed that the positive particles in an atom are centralized in the nucleus. Ernest Rutherford

 - c) is credited with proposing the atomic Plum Pudding Model. Lord Kelvin

d) is credited with publishing the first periodic chart, having placed elements in an array of rows and columns. Mendelev

7) Compound (define/describe)

Pure substance composed of two or more types of atoms; can be chemically decomposed into elements.

8) Which has the largest charge/mass ratio: proton, neutron, or electron? Can't be neutron--it doesn't have any charge. Both protons and electrons have charges of equal magnitude, but the mass of the electron is much less than a proton, therefore its charge/mass is much more.
ANS: electron.

9) The number of protons is referred to as ATOMIC NUMBER.

10) The number of protons plus neutrons is referred to as ATOMIC MASS

11) Give the symbol for a nitrogen atom with 6 neutrons: ${}^{13}_{7}\text{N}$

12) Group 1A elements are collectively known as ALKALINE

13) Group 2A elements are collectively known as ALKALINE EARTH.

14) Group 7A elements are collectively known as HALOGENS

15) Group 8A elements are collectively known as NOBEL GASES.

16) A familiar 'shape' can be drawn through the Periodic Chart to separate metals and non-metals. What is the shape? STAIRSTEP

17) What are the properties of a:

- a) metal - Lustrous (shiny); Ductile (pulled into wires); Malleable (hammered into sheets);
conductive of heat and electricity.
- b) non-metal- Do NOT have the properties of metals.

18) Give the Symbol, Atomic Number, and Class of Metal for:

- a) strontium - Sr, 38, metal
- b) silicon - Si, 14, non-metal

c) xenon - Xe, 54, non-metal

- 19) The 'driving force' for electron gain or loss by an atom can be thought of as its desire to obtain a NOBEL GAS CONFIGURATION .
- 20) Molecules comprised of two "types" of atoms are known as BINARY molecules; molecules comprised of two atoms of the same type are DIATOMIC molecules.
- 21) Different physical forms of a given element are referred to as ALLOTROPES.
- 22) Atoms with the same number of protons but different of neutrons is referred to as ISOTOPES.
- 23) Give the number of protons, neutrons, and electrons in the atom symbolized by:
- $$\begin{array}{c} 201 \\ \text{Mg} \\ 80 \end{array}$$
- 80 ; 121 (201-80) ; 80.
- 24) An atom which has lost or gained an electron is not longer referred to as an atom; rather, it is known as a(n) ION .
- 25) A positively charged ion is known as a(n) CATION;
a negatively charged ion is known as a(n) ANION.
- 26) Anions are sometimes named by modifying the name of the corresponding with the suffix -IDE .
- 27) A compound made from ions (for example, sodium chloride, made from a sodium cation, Na^+ , and a chloride anion, Cl^-) are referred to a(n) IONIC COMPOUND .
- 28) Write the formula for:
- sodium chloride - NaCl
 - barium oxide - BaO