FORM 6 CHEMISTRY WEEK 1 NOTES.

Atomic Structure, Bonding and Related properties.

Learning Outcomes:

- Define:
    a. Atom (1)
    b. Sub-atomic
        i. protons (1)
        ii. electrons (1)
        iii. neutrons (1)
- Describe the structure of an atom (2)
- State the characteristics of Sub-atomic particles (protons, electrons and neutron) in terms of their:
    a. charge (1)
    b. relative mass to the mass of a protons (1)
    c. location (1)
- State the symbol of:
    a. protons (1)
    b. electron (1)
    c. neutrons (1)

Atomic Structure

Atomic Structure with sub-particles

Atoms - are the smallest neutral particle of matter

- individual atoms are too small to be seen with the naked eye.
- However, if large group of atoms joined together, we may be able to view it. For example, four billion sodium atoms when but together would cover a full stop at the end of sentence.

Structure of an Atom

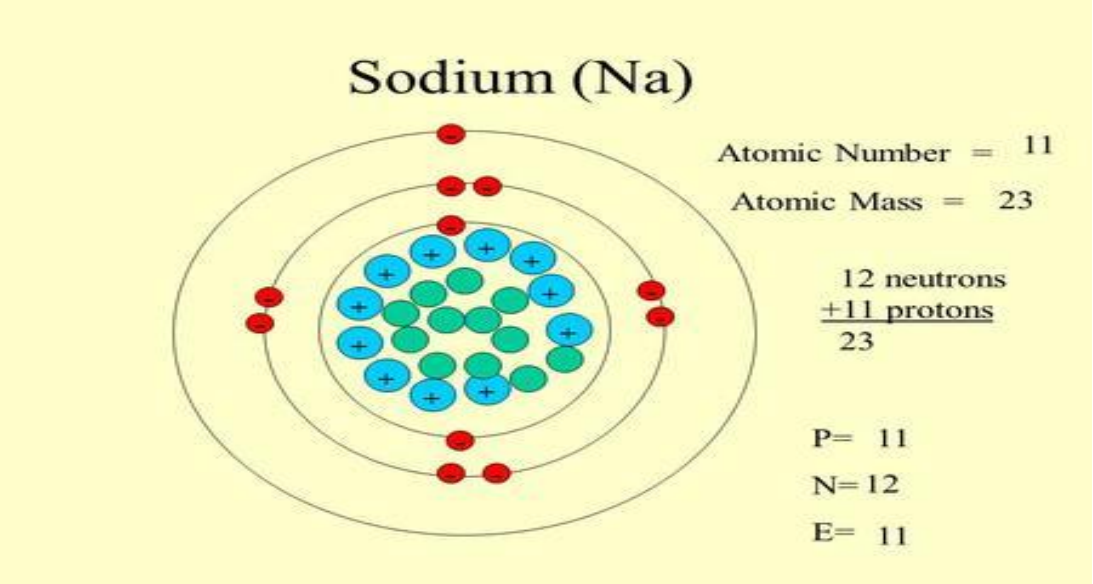
Atoms are of 3 small Sub-atomic particles. (Sub-atomic particles are particles smaller than/within an atom)

i. **Protons** - positively charge (+) particle found in the nucleus of an atom
ii. **Neutrons** - particle without a charge (0), i.e. neutral. It is found in the nucleus of the atom.
iii. **Electrons** - negatively charge (-) particle that surrounds the nucleus of the atom. They move rabidly in space around the nucleus forming what scientists described as an electrons cloud around the nucleus.

Subatomic particle	Symbol	Mass compared to a proton	Charge	Location
Proton	P	1	+1	Nucleus
Neutron	n	1	0	Nucleus
Electron	e	$\frac{1}{1804}$	-1	Moving outside the nucleus.

Example: Atomic Structure

A sodium atom has 11 protons, 12 neutrons and 11 electrons.



Exercise:

1. Define these words:
   a. Atom
   b. Protons
   c. Electrons
   d. Neutrons

2. Describe the structure of a lithium atom.

3. State the characteristics of sub-atomic particles (protons, electron and neutrons) in terms of their change, relative mass to the mass of a protons and their location.

4. State the symbol of the protons, electrons and neutrons.

Mass and Atomic number

Learning Outcomes:

- Define :
  a. Mass number (1)
  b. Atomic number of an atom (1)

- Determine the number of any Sub-atomic particle of an atom given the mass and atomic number (1 or 2)
- Determine the mass number or atomic number of an atom given its number of Sub-atomic particles (1)
- Identify an atom from given data on mass number and atomic number (1)

Mass and Atomic number

Atomic Number - the number of protons present in the nuclear of an atom. It is also equal to the number of electrons that surrounds the nucleus of an atom.

Atomic number = # of protons = # of electrons

Mass number - The number of protons plus neutrons presents in the nucleus of the atom makes up the mass of the atom. Electron are very small, and their mass are negligible, sometimes refer to as zero mass.

Mass number = # of protons + # of neutrons

Example A

A sodium atom has 11 protons, 12 neutrons and 11 electrons. Calculate its mass number.

Mass numbers = No of protons + No of neutrons
=11 + 12
=23

Therefore, the mass number of the sodium atom is 23.

Example B

Carbon has a mass number of 13. It has 6 protons in its nucleus. How many neutrons are there in this carbon atom.

Mass number = # of protons + # of neutrons 13 = 6 + # of neutrons
Therefore # of neutrons = 13 - 6
No. of neutrons = 7

Exercise

1. Define the following words:
    a. Mass number

    b. Atomic number of an atom

2. An atom has atomic number 20 and mass number of 42.
    a. Determine the number of protons in the atoms
    b. Determine the number of neutrons in the atom.

3. Determine the mass number of an atom containing 16 protons, 18 neutrons and 16 electrons.

4. An atom of chlorine has 17 protons and 18 neutrons. Determine the:
    a. Atomic number
    b. Mass number of chlorine

5. For a carbon atom with six protons and eight neutrons
    a. Find the number of electrons
    b. Write down the Atomic number
    c. Write down the mass number

6. Consider the atom with the symbol Y. The Atomic number in this atom will be 8 with a mass number 16. Identify an atom by writing its correct symbol and name.

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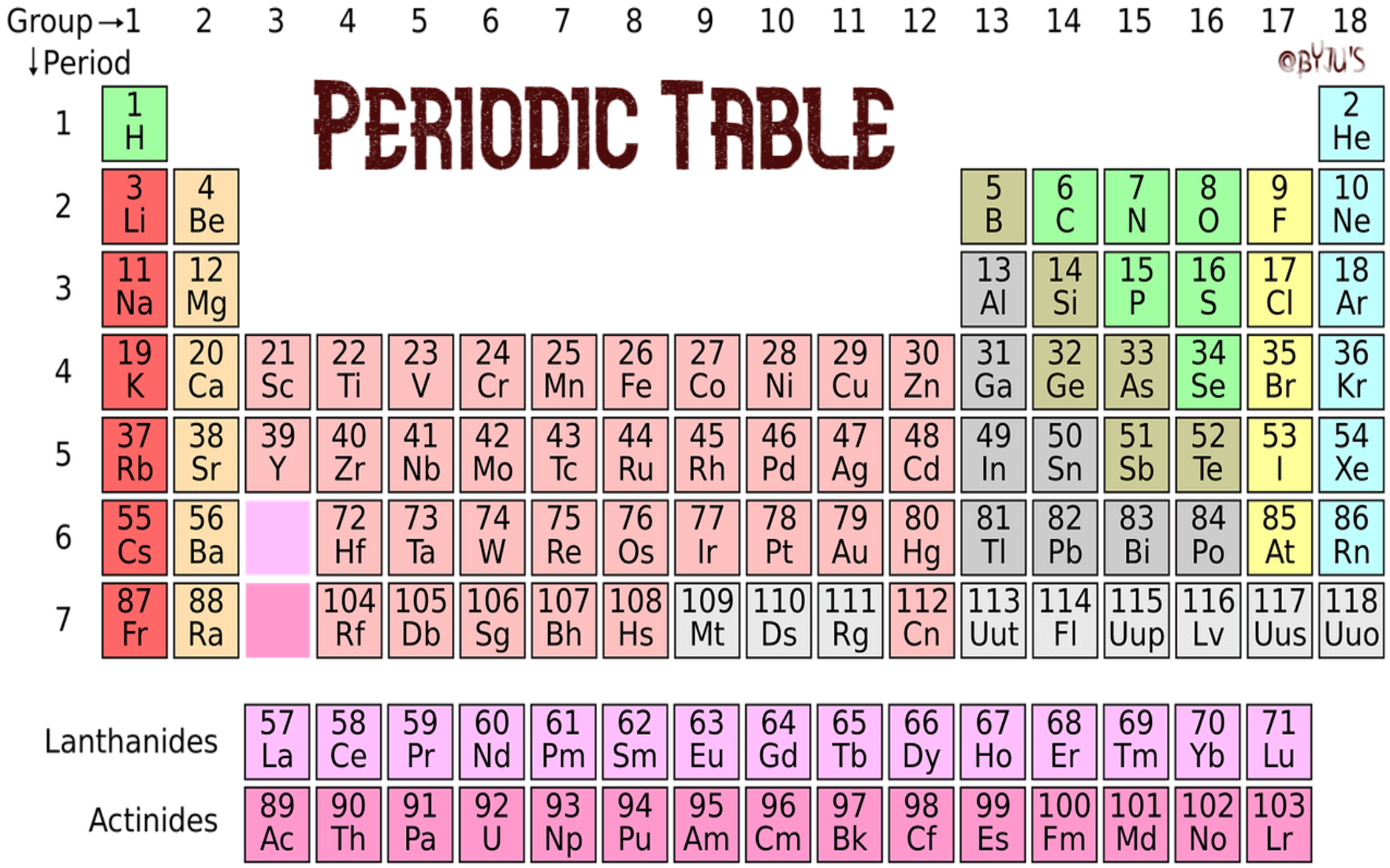
PERIODIC TABLE



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