

HW 3 *Structure of an atom, subatomic particles*

- Atoms are made of **nucleus** and an **electron cloud** around it
- The **electron** cloud has a negative charge, **protons in the nucleus** have positive charge.
- In each atom the number of protons is equal to the number of electrons so as a whole an atom is neutral
- (An atom can lose or acquire electrons, getting charged)
- In addition to protons a nucleus contains **neutrons**. The neutrons do not have any charge.
- Electrons, protons, and neutrons are subatomic particles

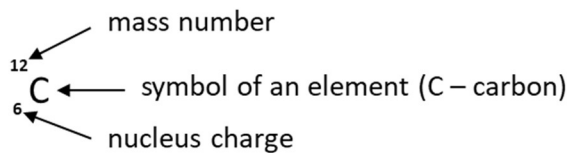
An element is a substance with the atoms that have the same charge of the nucleus. An element always increases its weight in chemical reactions.

$$A = Z + N$$

A – mass number of an atom

Z – charge of the nucleus

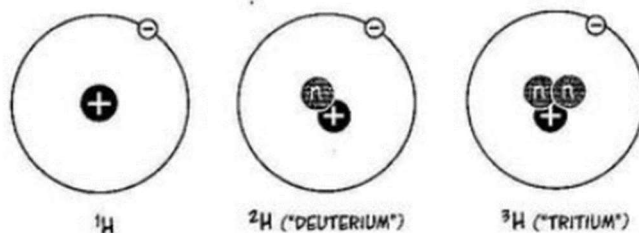
N – number of neutrons in the nucleus



Isotopes are substances made of atoms with the same charge of the nucleus (the same number of protons), but with different number of neutrons in the nucleus. Isotopes differ only by their mass number. All elements contain one or several isotopes.

Hydrogen is the only element that has different symbols and names for its isotopes:

- ^1H – protonium
- ^2D – deuterium
- ^3T – tritium



Fill out the tables:

Symbol	$^{16}_8\text{O}$	$^2_1\text{D}^+$			
Number of protons	8			14	16
Number of neutrons	8		14	14	18
Number of electrons	8	0	10		18
Charge	0	+1	+3	0	

Symbol	$^{14}_7\text{N}$	$^{35}_{17}\text{Cl}^-$			
Number of protons	7		18		17
Number of neutrons	7		22	20	20
Number of electrons	7	18		18	18
Charge	0	-1	0	+2	