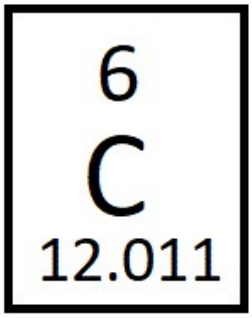
HW 2 ***Structure of an atom, subatomic particles***

- 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
- Mass number of an atom is the number of protons plus the number of neutrons in the nucleus of an atom.
- The relative atomic mass $\mathbf{A_r}$ of an element is the average of the masses of all natural isotopes of this element relative to the mass of 1/12 of an atom of carbon-12 (we see this atomic weight in the periodic table). For example, atomic weight of iron (Fe) is 55.845. It means the average mass of all isotopes of iron is 55.845 times heavier than the mass of 1/ 12 of an atom of carbon-12.

6 is atomic number

12.011 atomic weight.



<u>In a text we write $^{12}_{6}C$, the mass is on the top, the atomic number is on the bottom.</u>

Isotopes are different atoms of the same element. They have 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.

Answer the following questions:

1. How many protons and neutrons are in the nucleus of oxygen $^{16}_{8}O$?
2. How many protons, neutrons and electrons are in the atom of boron $^{11}_{5}B$?
3. How many electrons in the atom of $^{207}_{82}Pb$?
4. What is the charge of manganese (Mn) atom?
5. How many neutrons in a sodium atom $^{23}_{11}Na$?
6. **Bonus question:** Lithium has two isotopes**.** Natural abundance of ^{6}Li isotope is 7%, For ^{7}Li the abundance is 93%. Calculate atomic weight (relative atomic mass) of lithium. Show me your calculations, do not look at the periodic table.