

### 6.4.4 BOHR-RUTHERFORD DIAGRAMS

The number of protons that an atom of an element has can be found in the periodic table by finding the ATOMIC NUMBER (the smaller number). Therefore, we can also find the number of electrons.

### HOW DO YOU FIND THE NUMBER OF NEUTRONS?????

The number of neutrons can be determined if you know the mass of the nucleus. You simply take the "**Atomic Mass**" (the larger number), round the atomic mass to a whole number to get the **Mass Number**, and subtract the Atomic Number from it.

**# Neutrons = Mass Number - Atomic Number**

Example: Hydrogen (H)

atomic number = 1

number of protons = 1, and number of electrons = 1

atomic mass = 1.008 which rounds to 1

number of neutrons = atomic mass – atomic number =  $1 - 1 = 0$

### **To draw Atomic Symbols:**

1. Write down the chemical symbol of the element.
2. Up and to the left, write the mass number.
3. Down and to the left, write the atomic number.

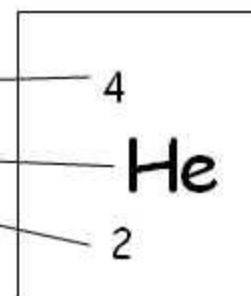
The general notation for an Atomic Symbol is:



where A is the **mass number**

where X is **element symbol**

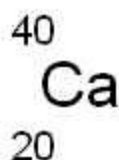
where Z is the **atomic number**



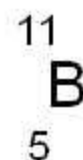
Eg.: fluorine



calcium



boron

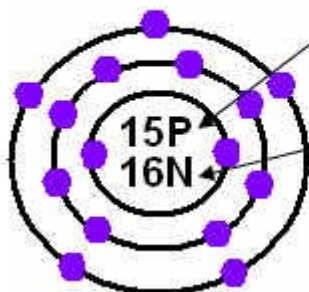
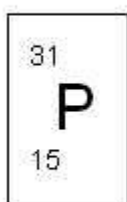


**To draw Bohr-Rutherford Diagrams:**

1. Draw the nucleus as a solid circle.
2. Put the number of protons (atomic number) in the nucleus with the number of neutrons (atomic mass – atomic number) under it.
3. Place the number of electrons (same as protons) in orbits around the nucleus by drawing circles around the nucleus.

Remember, 1<sup>st</sup> shell – 2 electrons, 2<sup>nd</sup> shell – 8 electrons, 3<sup>rd</sup> shell – 8 electrons, 4<sup>th</sup> shell – 18 electrons.

Example: phosphorus



# of Protons = atomic #

# of Protons = 15

# of Neutrons = mass # - atomic #

# of Neutrons = 31 - 15

# of Neutrons = 16

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