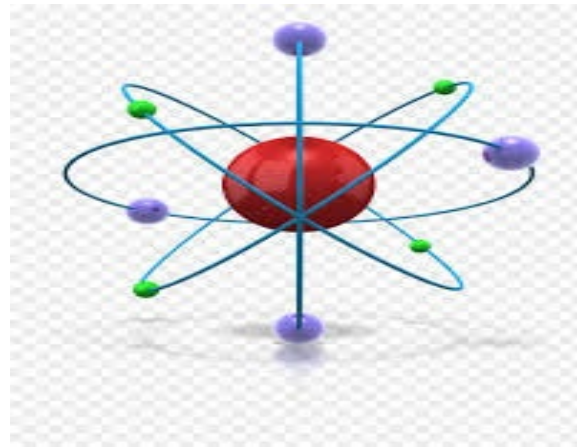


Structure of Atom



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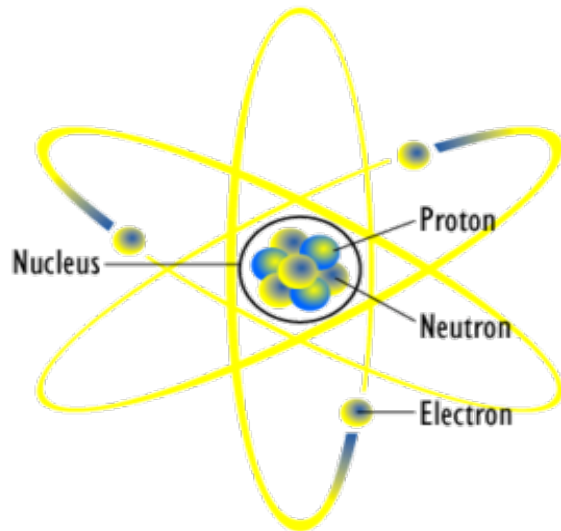
Introduction of Atom

- Greek word → **Atomos** → **Indivisible**
- Indian scientist → **Parmanu**

- **Definition of Atom**

- **Matter can be broken down into very small invisible particles called Atom.**

STRUCTURE OF ATOM



- ✓ Atom consists of positively charged proton (P^+) and neutral neutron (n^0).
- ✓ second part is Extra nucleus part, it contains negatively charged electrons (e^-) only.

VIEW OF DEMOCRITUS

THE NATURE OF MATTER. HE ALSO PROPOSED THAT ALL SUBSTANCES ARE MADE UP OF MATTER. HE STATED ATOMS ARE CONSTANTLY MOVING, INVISIBLE, MINUSCULE PARTICLES THAT ARE DIFFERENT IN SHAPE, SIZE, AND CANNOT BE DESTROYED.

Atomic theory of John Dalton (1808)



End of 18th and the early 20th centuries



Scientists



J.J Thomson, Goldstein, Rutherford, Bohr



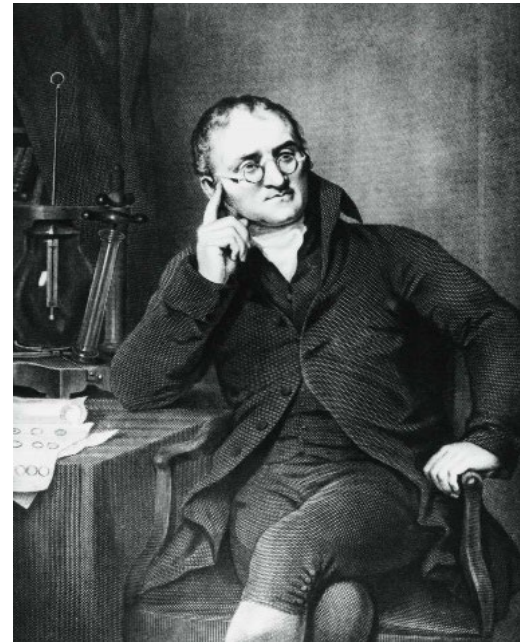
Modern concepts on Atom



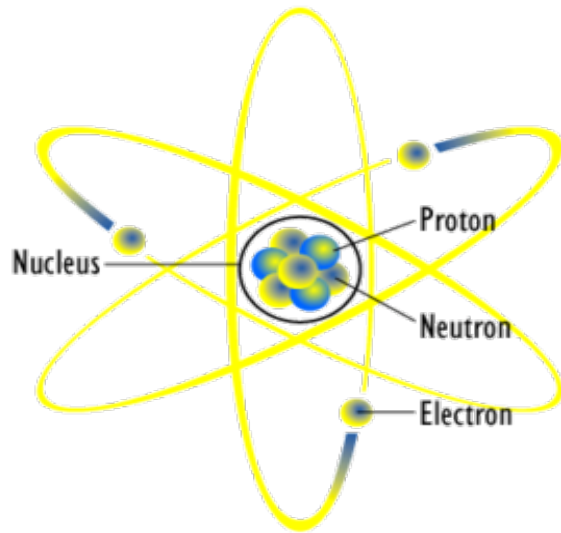
An atom is present at the most basic level in everything we see around us.

Atomic theory of John Dalton (1808)

- Atom is the smallest unit of matter that is composed of a positively charged centre termed as “nucleus” and the central nucleus is surrounded by negatively charged electrons.
- An atom is the smallest unit of matter but it retains



ATOMIC STRUCTURE

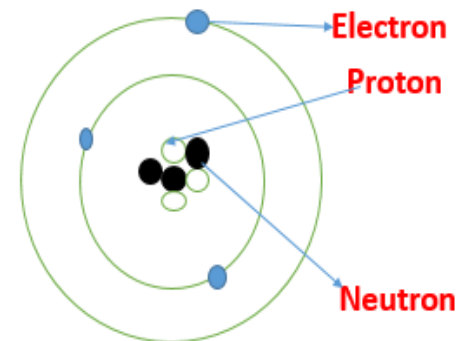


- ✓ Atom consists of positively charged proton (P^+) and neutral neutron (n^0).
- ✓ second part is Extra nucleus part, it contains negatively charged electrons (e^-) only.

Concept of Proton, Neutron and Electron

- The tiny atomic nucleus is the centre of an atom constituting positively charged particles “**protons**” and uncharged particles “**neutrons.**”
- larger Part of nucleus is composed of a cloud of negatively charged particles called an **electron.**
- Electrons revolve around the centre of the nucleus.
- The attraction between the protons and electrons holds the structure of an atom together.

Part of Atom



- **All atoms are composed of these three subatomic particles except hydrogen.**
- **Hydrogen is an exception to all atoms as it just contains one proton and one electron but lacks neutrons.**

Atoms are electrically neutral

- The atomic nucleus in the structure of the atom is composed of a fixed number of protons and the proton attracts the same number of electrons thereby making an atom **electrically neutral**.
- Ions are formed by addition or removal of electrons from an atom.

Atoms are electrically neutral!

It means, in an atom-

Number of Protons (+) = number of electrons (-)



Total Positive charge = total negative charge

TIP to remember charge on particles:
P for Protons,
P for Positive/Plus charge



TSR N/Os Gar/2016-17

Concept of Electron

1897



British Physicist



J.J Thompson



one negatively charged particle



Corpuscles

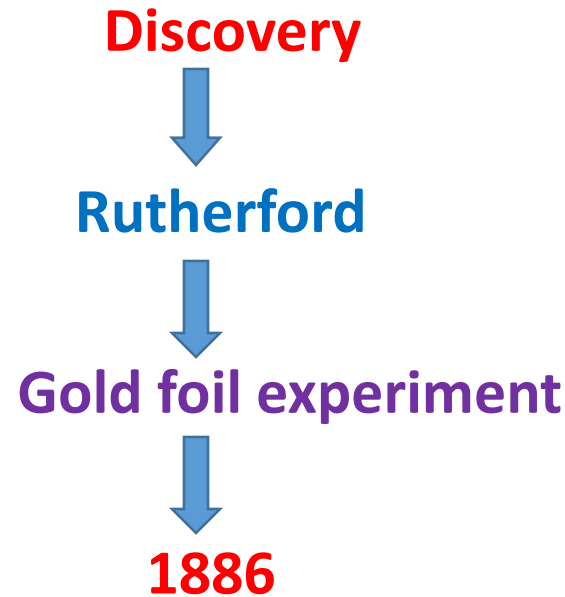


Electron

Charge of Electron

- Absolute charge of an electron = 1.6×10^{-19} coulombs
- The relative mass of an electron is $1/1836$ so the mass of an electron is very small as negligible

Concept of Proton



Goldstein → Discharged tube ← Positively charged rays

Anode rays → Canal rays → Discovery of protons.

Protons are known as the particles that contribute to the positive charge of the atom.

Charge and mass of proton

Charge of a proton $P = 1.6 \times 10^{-19}$ coulomb

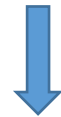
Mass of a proton = 1.6×10^{-24} g = 1 = Mass of a hydrogen atom.

CONCEPT OF NEUTRON

Neutron "n"



Discovery in 1932



James Chadwick



Neutral mass particle



Present in an atom's nucleus.

➤ **The mass of a neutron is measured to be 1.6×10^{-24} g. It is equal to the mass of protons.**

What is the net charge of an atom?

Net charge of an atom

- Electrons are the negatively charged particle
- protons are the positively charged particles.
- The equal positive charge of the proton and the negative charge of the electron cancel each other.

Therefore, the atom has no net charge.

- In an atom that is neutral,
- The number of electrons revolving around the nucleus = The number of protons inside the nucleus

All atoms are electrically neutral