NDA CDS
COACHING CENTRE

PERIODIC TABLE ELEMENTRY IDEAS ABOUT THE STRUCTURE OF ATOM

Periodic Table of the Elements

1 1IA 11A	2 IIA 2A	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9	10	11 IB 1B	12 IIB 2B	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A
1 **H** Hydrogen 1.0079																	2 **He** Helium 4.00260
3 **Li** Lithium 6.941	4 **Be** Beryllium 9.01218											5 **B** Boron 10.811	6 **C** Carbon 12.011	7 **N** Nitrogen 14.00674	8 **O** Oxygen 15.9994	9 **F** Fluorine 18.998403	10 **Ne** Neon 20.1797
11 **Na** Sodium 22.989768	12 **Mg** Magnesium 24.305											13 **Al** Aluminum 26.981539	14 **Si** Silicon 28.0855	15 **P** Phosphorus 30.973762	16 **S** Sulfur 32.066	17 **Cl** Chlorine 35.4527	18 **Ar** Argon 39.948
19 **K** Potassium 39.0983	20 **Ca** Calcium 40.078	21 **Sc** Scandium 44.95591	22 **Ti** Titanium 47.88	23 **V** Vanadium 50.9415	24 **Cr** Chromium 51.9961	25 **Mn** Manganese 54.938	26 **Fe** Iron 55.847	27 **Co** Cobalt 58.9332	28 **Ni** Nickel 58.6934	29 **Cu** Copper 63.546	30 **Zn** Zinc 65.39	31 **Ga** Gallium 69.732	32 **Ge** Germanium 72.64	33 **As** Arsenic 74.92159	34 **Se** Selenium 78.96	35 **Br** Bromine 79.904	36 **Kr** Krypton 83.80
37 **Rb** Rubidium 85.4678	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.90585	40 **Zr** Zirconium 91.224	41 **Nb** Niobium 92.90638	42 **Mo** Molybdenum 95.94	43 **Tc** Technetium 98.9072	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.9055	46 **Pd** Palladium 106.42	47 **Ag** Silver 107.8682	48 **Cd** Cadmium 112.411	49 **In** Indium 114.818	50 **Sn** Tin 118.71	51 **Sb** Antimony 121.760	52 **Te** Tellurium 127.6	53 **I** Iodine 126.90447	54 **Xe** Xenon 131.29
55 **Cs** Cesium 132.90543	56 **Ba** Barium 137.327	57-71	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.9479	74 **W** Tungsten 183.85	75 **Re** Rhenium 186.207	76 **Os** Osmium 190.23	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.08	79 **Au** Gold 196.9665	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.3833	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98037	84 **Po** Polonium [208.9824]	85 **At** Astatine 209.9871	86 **Rn** Radon 222.0176
87 **Fr** Francium 223.0197	88 **Ra** Radium 226.0254	89-103	104 **Rf** Rutherfordium [261]	105 **Db** Dubnium [262]	106 **Sg** Seaborgium [266]	107 **Bh** Bohrium [264]	108 **Hs** Hassium [269]	109 **Mt** Meitnerium [268]	110 **Ds** Darmstadtium [269]	111 **Rg** Roentgenium [272]	112 **Cn** Copernicium [277]	113 **Uut** Ununtrium unknown	114 **Uuq** Ununquadium [289]	115 **Uup** Ununpentium unknown	116 **Uuh** Ununhexium [298]	117 **Uus** Ununseptium unknown	118 **Uuo** Ununoctium unknown

Lanthanide Series	57 **La** Lanthanum 138.9055	58 **Ce** Cerium 140.115	59 **Pr** Praseodymium 140.90765	60 **Nd** Neodymium 144.24	61 **Pm** Promethium 144.9127	62 **Sm** Samarium 150.36	63 **Eu** Europium 151.9655	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.92534	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93032	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93421	70 **Yb** Ytterbium 173.04	71 **Lu** Lutetium 174.967
Actinide Series	89 **Ac** Actinium 227.0278	90 **Th** Thorium 232.0381	91 **Pa** Protactinium 231.03588	92 **U** Uranium 238.0289	93 **Np** Neptunium 237.0482	94 **Pu** Plutonium 244.0642	95 **Am** Americium 243.0614	96 **Cm** Curium 247.0703	97 **Bk** Berkelium 247.0703	98 **Cf** Californium 251.0796	99 **Es** Einsteinium [254]	100 **Fm** Fermium 257.0951	101 **Md** Mendelevium 258.1	102 **No** Nobelium 259.1009	103 **Lr** Lawrencium [262]

Alkali Metal | Alkaline Earth | Transition Metal | Basic Metal | Semimetals | Nonmetals | Halogens | Noble Gas | Lanthanides | Actinides

S Block Elements

valence electron configuration is $ns^{1\text{-}2}$

Helium

1 H Hydrogen 1.008																	18 2 He Helium 4.003
3 Li Lithium 6.941	2 4 Be Beryllium 9.012											13 5 B Boron 10.811	14 6 C Carbon 12.011	15 7 N Nitrogen 14.007	16 8 O Oxygen 15.999	17 9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	3 21 Sc Scandium 44.956	4 22 Ti Titanium 47.88	5 23 V Vanadium 50.942	6 24 Cr Chromium 51.996	7 25 Mn Manganese 54.938	8 26 Fe Iron 55.845	9 27 Co Cobalt 58.933	10 28 Ni Nickel 58.693	11 29 Cu Copper 63.546	12 30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [278]	110 Ds Darmstadtium [281]	111 Rg Roentgenium [280]	112 Cn Copernicium [285]	113 Nh Nihonium [286]	114 Fl Flerovium [289]	115 Mc Moscovium [289]	116 Lv Livermorium [293]	117 Ts Tennessine [294]	118 Og Oganesson [294]

57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

Alkali metals

Alkaline earths

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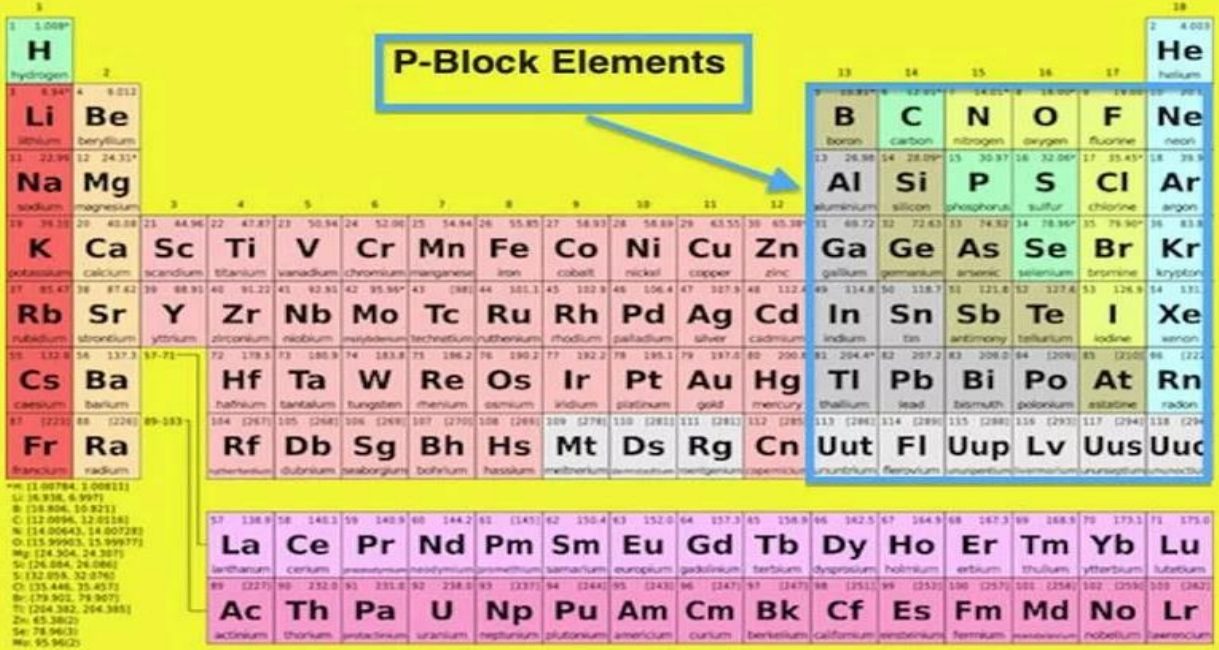
THE *P*-BLOCK ELEMENTS



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Mass number (number of protons + neutrons)

$$^{A}_{Z}X$$

Element symbol

Atomic number (number of protons)

$$^{12}_{6}C$$

Mass Number

Atomic Number

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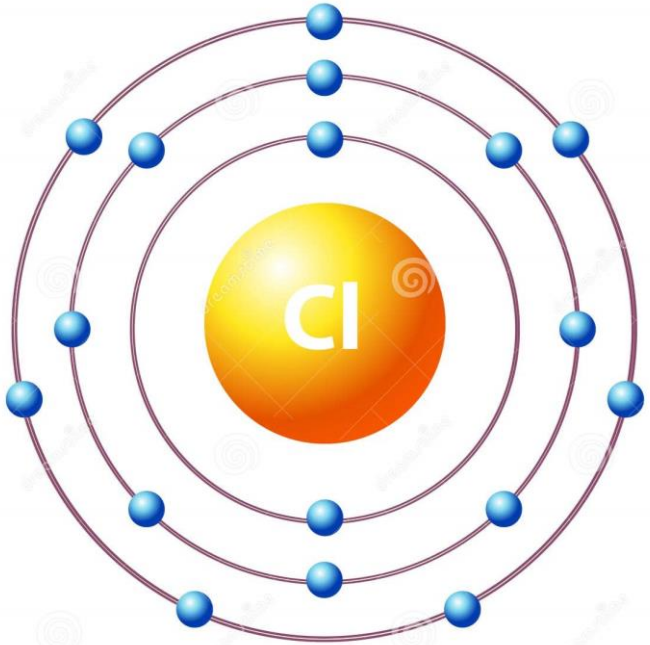
17 **Chlorine** Cl



Atomic mass: 35.45

Electron configuration: 2, 8, 7

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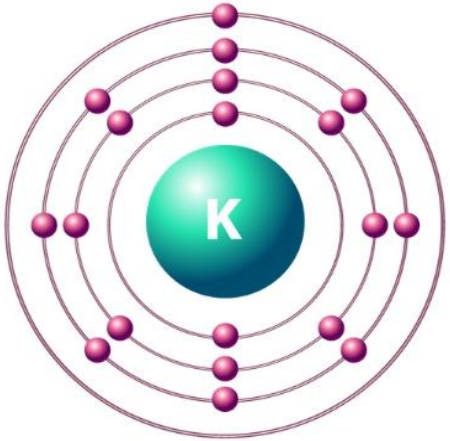
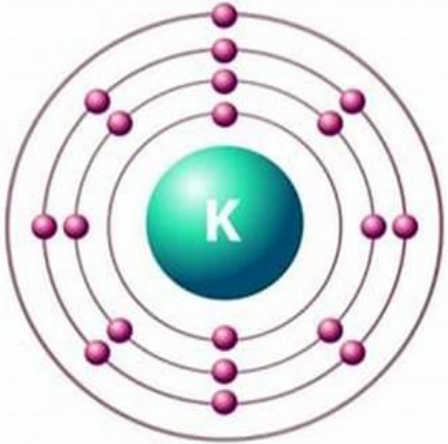
19 **Potassium** K



Atomic mass: 39.098
Electron configuration: 2, 8, 8, 1

20 **Calcium** Ca



Atomic mass: 40.078
Electron configuration: 2, 8, 8, 2

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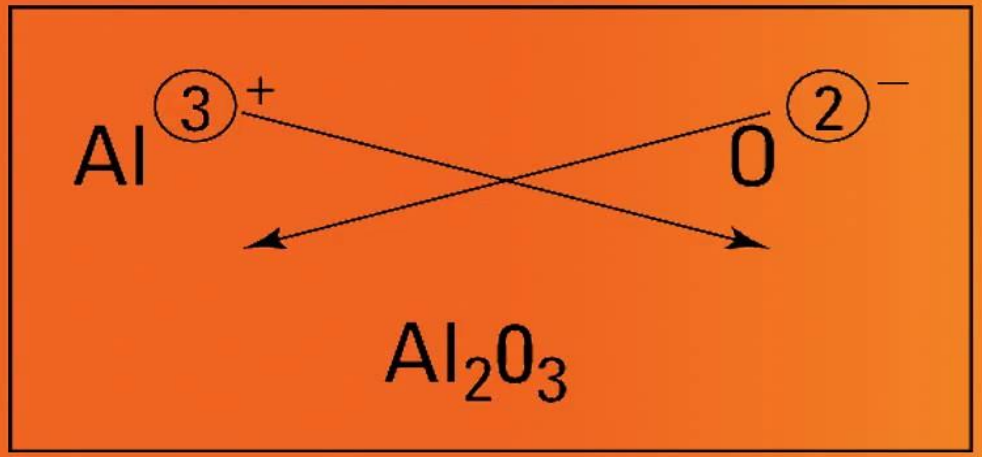
WRITING CHEMICAL FORMULAE OF COMPOUND CRISS-CROSS METHOD



RAVI ACADEMY

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i) Symbol / Formula Na O

Charge 1 + 2 –

Formula : Na_2O

The formula of sodium oxide is Na_2O.

ii) Symbol / Formula Al Cl

Charge 3 + 1 –

Formula : $AlCl_3$

The formula of aluminium chloride is $AlCl_3$.

iii) Symbol / Formula Na SO_4

Charge 1 + 2 –

Formula : Na_2SO_4

The formula of sodium sulphate is Na_2SO_4.

iv) Symbol / Formula Mg OH

Charge 2 + 1 –

Formula : $Mg(OH)_2$

Q1. Which of the following are matter?

- Chair, air, love, smell, hate, almonds, thought, cold, lemon water, the smell of perfume.

Solution:

- The following substances are matter:

- Chair
- Air
- Almonds
- Lemon water
- The smell of perfume (Smell is considered as a matter due to the presence of some volatile substances in air that occupy space & have mass.)

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Q2. Give reasons for the following observation:

- The smell of hot sizzling food reaches you several meters away, but to get the smell from cold food, you have to go close.

Solution:

- Particles in the air, if fueled with higher temperatures, acquire high kinetic energy, which aids them to move fast over a stretch. Hence, the smell of hot sizzling food reaches a person even at a distance of several meters.

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Q3. A diver is able to cut through water in a swimming pool. Which property of matter does this observation show?

Solution:

- The diver is able to easily cut through the water in the swimming pool because of the weak forces of attraction between water molecules. It is this property of water that attributes to easy diving.

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Q4. What are the characteristics of the particles of matter?

Solution:

- The characteristics of particles of matter are as follows:

- Presence of intermolecular spaces between particles
- Particles are in constant motion
- They attract each other
- All matter is composed of very small particles which can exist independently.

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Q5. Give reasons

a) A gas fills completely the vessel in which it is kept.

b) A gas exerts pressure on the walls of the container.

c) A wooden table should be called a solid.

d) We can easily move our hand in the air, but to do the same through a solid block of wood, we need a karate expert.

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Q6. Convert the following temperature to Celsius scale:

a. 300K

b. 573K

Solution:

a. 0°C=273K

300K= (300-273)°C = 27°C

b. 573K= (573-273)°C = 300°C

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Q7. What is the physical state of water at:

a. 250°C

b. 100°C ?

Solution:

a. At 250°C – Gaseous state since it is beyond its boiling point.

b. At 100°C – It is at the transition state as the water is at its boiling point.

Hence it would be present in both liquid and gaseous states.

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Elementary idea about the structure of atom

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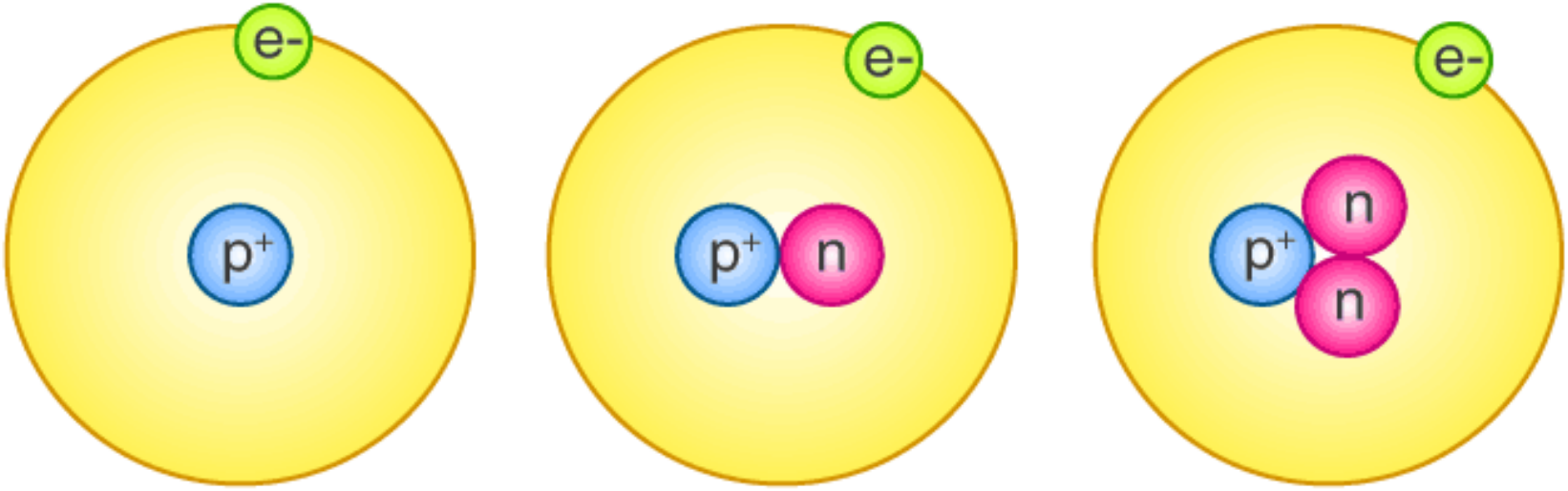

Hydrogen-1
Mass number : 1

Hydrogen-2
Deuterium
Mass number : 2

Hydrogen-3
Tritium
Mass number : 3

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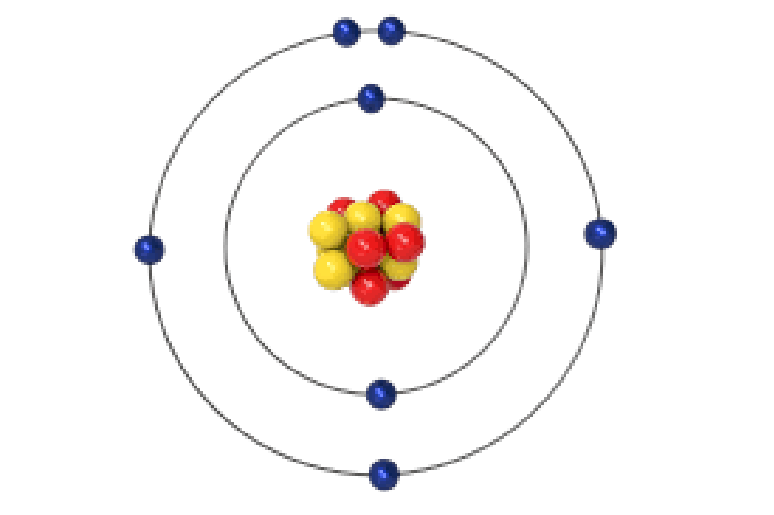
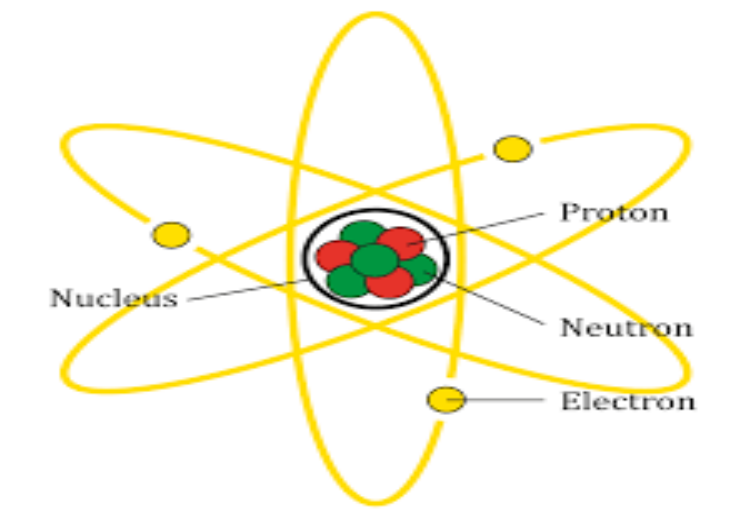
The atomic structure refers to the structure of an atom comprising a nucleus (center) in which the protons (positively charged) and neutrons (neutral) are present. The negatively charged particles called electrons revolve around the centre of the nucleus.

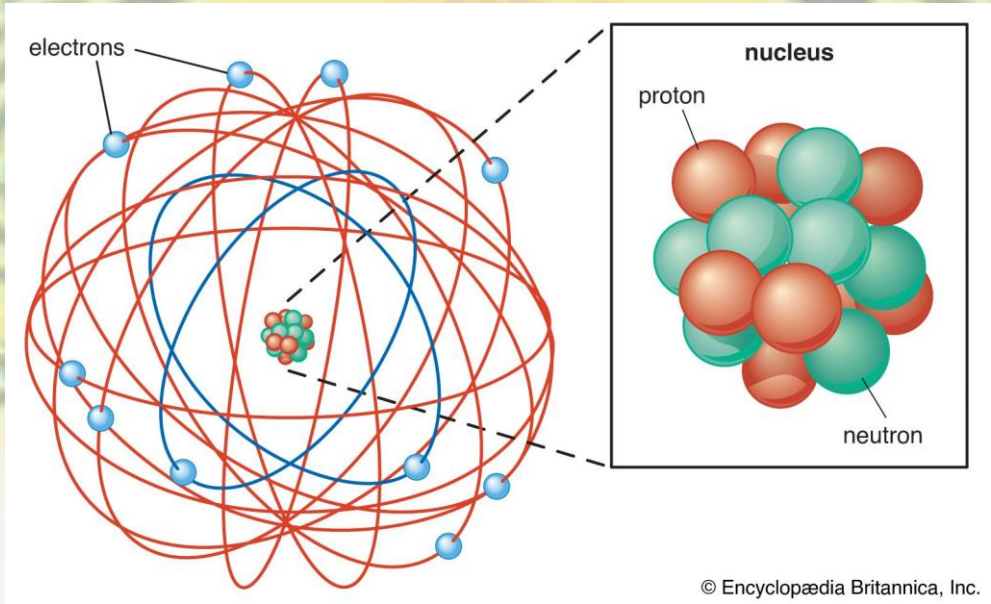
- **Discovery of Subatomic Particles**



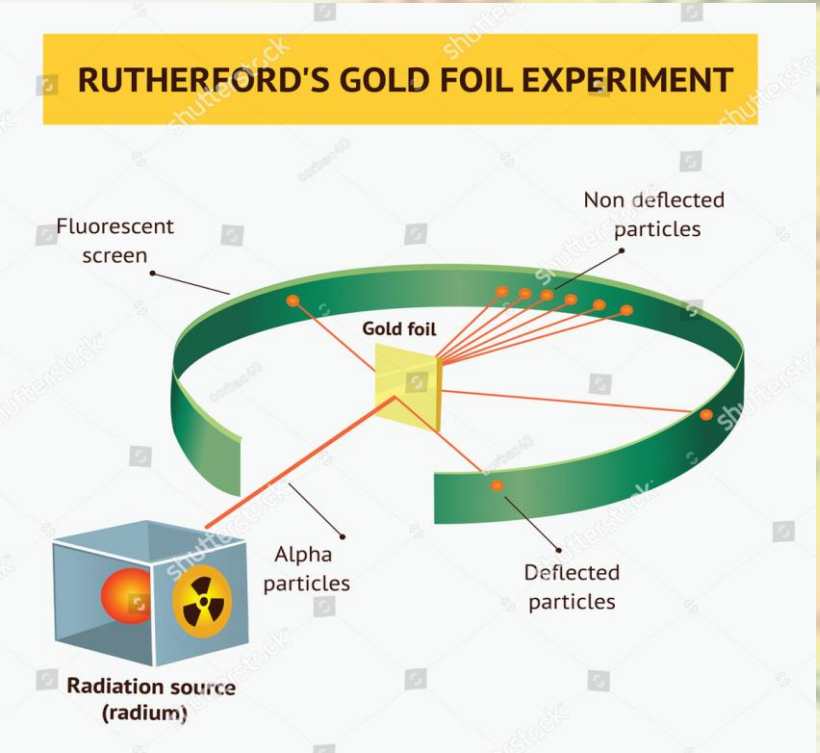


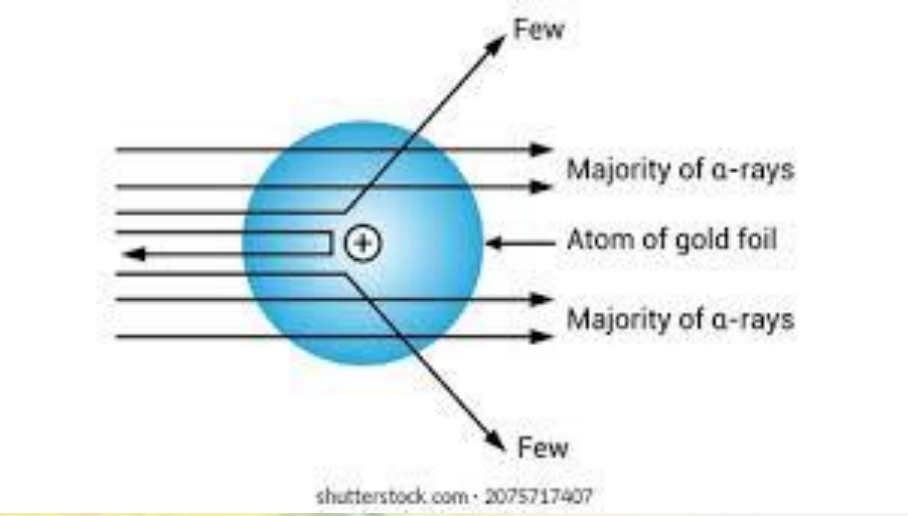
- **Rutherford Atomic Theory**

Rutherford, a student of J. J. Thomson, modified the atomic structure with the discovery of another **subatomic particle called "Nucleus"**. His atomic model is based on the Alpha ray scattering experiment.



- **Alpha Ray Scattering Experiment**





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Q. Scattering of α-particles by a thin gold foil suggests the presence of

a) Electron in an atom
b) Positively charged nucleus at the center of an atom
c) Proton in an atom
d) Isotopes of gold