• PERIODIC CLASSIFICATION OF ELEMENTS •

- There are 118 elements, known at present.
- All the elements have been divided into a few groups in such a way that elements in the same group have similar properties.

• DOBEREINER'S TRIADS -

- All the elements having similar properties were put in one group called a family.
- 1829, German chemist Dobereiners observed that certain elements had similar properties and that he could put them together in groups of three elements each.
- These groups of three elements were called - Traids.

- According to Dobereiner's traids -
- When elements are arranged in the order of increasing atomic masses, groups of three elements having similar chemical properties are obtained.
- The atomic mass of the middle element of the traid being equal to the arithmetic mean of the atomic masses of other two elements.
- According to Dobereiners trait -
- When elements are arranged in the order of increasing atomic masses, groups of three elements having similar chemical properties are obtained.
- The atomic mass of the middle element of the traid being equal to the arithmetic mean of the atomic masses of the other two elements.
- The alkali metal group - The elements lithium, sodium and potassium properties and form a traid.
- All these elements are metals. All of them react with water to form alkalis and hydrogen gas.
- All of them have a valency of 1 - monovalent.
- lithium is the first element of traid.
- Sodium is the second element of traid.
- Potassium is the third element of traid.
  - Atomic mass of lithium = 7
  - Atomic mass of potassium = 39
- Arithmetic mean of atomic mass = $\frac{7 + 39}{2} = \frac{46}{2} = 23$
  - Actual atomic mass of Na is - 23

- The arithmetic mean of the atomic masses of lithium and potassium is equal to (23) the actual atomic mass of the middle element of the traid sodium.

- **The alkaline earth metal group-**
- The elements calcium, strontium and barium have similar chemical properties.
- All these elements are metals. The oxides of all of them are alkaline in nature.
- All these elements have a valency of 2 (they are divalent).
- The arithmetic mean of the atomic masses of the first and third members of this traid it will be come to be -
- $\frac{40 + 137}{2} = 88.5$ The actual atomic mass of the middle element is 88.5
- **Atomic mass of the element = Arithmetic mean of the atomic masses of 1st and 3rd elements.**

Element of traid	Symbol	Atomic masses	
Lithium	Li	7	
Sodium	Na	23	– Alkali metal group
Potassium	K	39	
Calcium	Ca	40	
Strontium	Sr	88	– Alkaline earth metal group
Barium	Ba	137	
Chlorine	Cl	35.5	
Bromine	Br	80	– Halogen group.
Iodine	I	127	

- **The Halogen group** - The elements chlorine, Bromine, Iodine have similar chemical property.
- All these elements are nonmetals. All these elements reacts with water to form acids.
- All these elements have valency of 1, they are monovalent.
- Arithmetic mean = $\frac{35.5 + 127}{2} = 81.2$
- **Halo** - salt **gen** - generator or producer.

- The limitation of Dobereiner's classification -
- It failed to arrange all the then known elements in the form of traids of elements having similar chemical properties.
- He can identify only three traids from the element known at that time. so classification of the element was not much successful.

• NEWLAND LAW OF OCTAVES -

- In 1864, Newland arranged then known elements in the order of increasing atomic masses and found that the properties of every eight element are similar to the properties of the first element.
- According to the newlands law of octaves - **When elements are arranged in the order of increasing atomic masses, the properties of eight element are repetition of the properties of the first element.**
-

sa (do)	re (re)	ga (mi)	ma (fa)	pa (so)	da (la)	ni (ti)
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co and Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce and La	Zr	—	—

- Lithium as the first element, we find that the eight element from it is sodium (Na). lithium and sodium are similar chemical properties.
- Sodium (Na) as the first element, we find that the eight element from it is potassium (K). Sodium and potassium have similar chemical properties.
- **All the three elements lithium, sodium and potassium posses similar chemical properties.**
- similary, all the three elements beryllium, magnesium and calcium possess similar chemical properties.
- **Newland could classify elements only upto calcium.**
- Limitations -
- It could capable upto calcium only. after calcium every elements (eight position) did not possess the properties similar to that of the first element.
- Newland assumed that only 56 elements existed in nature and no other elements would be discovered later but several new elements were discovered whose properties did not fit into octaves.
- In order to fit element into this table, Newlands put even two elements in one slot, example, the two elements cobalt and nickel were put together in one slot.

- Iron element (Fe) which resembles cobalt and nickel elements in properties, was far away from these elements.

- **Periodic table-**
- It is the chart of the elements prepared in a such way that the elements having similar properties occurs in the same vertical column or group.
- **Horizontal rows - Periods** • **Vertical columns - Groups**
- The general formula of the oxides and hydrides of element, the element represent by letter 'R'.
- If some elements form oxides having the same general formula, then they will have similar chemical properties.
- For example - the elements Li, Na and K form the oxides LiO_2, Na_2O and K_2O. having the general formula. R_2O.
- Other form oxides having general formula - **RO** - MgO, R_2O_3 - Al_2O_3
- **If some elements form hydrides, having the same general formula, then they will have similar chemical properties.**
For example - the elements Li, Na and K form the hydrides - **LiH, NaH and KH** having general formula - RH.
- The formula RH is of element hydrides such as - LiH, NaH and KH.

- **Mendelev's periodic table-**
- When elements are arranged in the order of increasing atomic masses, the element with similar properties occurs at intervals.
- According to the mendeleev's periodic table-
- A properties of element are periodic function of their atomic masses.
- **Seven periods** - Horizontal row **Eight group** - vertical columns
- First seven groups are normal elements, eight group is of transition elements.

- **The two main features of mendeleeve periodic classification-**
- Gaps in the periodic table • wrong order of atomic masses

- **Factors-**
- increasing atomic masses • grouping together of elements having similar properties
- Gaps are left in periodic table because - he thinks that the elements were discovered later on and found to be very close, undiscovered elements at that time for which gaps were left in periodic table.
- **Eka boron, Eka-aluminium and eka silicon by prefix - eka** means first. So eka-boron means, first comes boron and then unknown element.

- When these elements were discovered later on, the eka boron was named as - scandium (Sc).
- Eka-aluminium was named as- Gallium (Ga).
- Eka-silicon was named as- Germanium (Ge).
- Mendeleev placed a few elements in the wrong order of their atomic masses by keeping the element with higher atomic mass first and the lower atomic mass later.
- Example- Placed cobalt (58.9) before nickel (lower atomic mass 58.7)

Merits of mendeleev's classification

- Mendeeleevs periodic law predicted the existence of some elements that had not been predicted at that time-
- Mendeleevs periodic table left proper gaps for then undiscovered elements like Gallium (Ga), scandium (Sc) and germanium (Ge). When these element were discovered later on, they were placed in those gaps, without disturbing the existing element.
- Mendeelev periodic table could predict the properties of several elements on the basis of their position in the periodic table-
- **Mendeleeves periodic table could accommodate noble gases when they were discovered** - The noble gas kept or placed in the separate group because they are chemically unreactive.

Anomalies or Limitations-

- The position of isotopes could not be explained-
Isotopes are the atoms of the same element having similar chemical properties but different atomic masses.
- If the elements are arranged according to the atomic masses, the isotope should be placed in different atoms or groups of periodic table.
- Isotopes were not given seperate place in table.
For example - The element chlorine has two isotopes, Cl-35 and Cl-37 having atomic masses of 35 and 37.
- Placing of these two isotopes of chlorine in the same group of the periodic table could not be explained.
- **Wrong order of atomic masses of some elements could not be explain-**
- According to mendeleev's periodic law, the elements are arranged in the order of increasing atomic masses.
- The element with lower atomic mass should come first and the element higher than should come later.

- But it was found that the element with higher atomic mass comes first and the element with later comes.
- The element cobalt having higher atomic mase of 58.9 comes first and nickel element with slightly lower atomic mass of 58.7 comes later.
- A correct position could not be assigned to hydrogen in the periodic table. on the basis of its properties, hydrogen element could placed in alkali metal group as well as in halogen atom.

Groups Oxide: Hydride:	I R_2O RH	II RO RH_2	III R_2O_3 RH_3	IV RO_2 RH_4	V R_2O_5 RH_3	VI RO_3 RH_2	VII R_2O_7 RH	VIII RO_4
Periods ↓	A B	A B	A B	A B	A B	A B	A B	Transition series
1	H 1.008							
2	Li 6.939	Be 9.012	B 10.81	C 12.011	N 14.007	O 15.999	F 18.998	
3	Na 22.99	Mg 24.31	Al 26.98	Si 28.09	P 30.0974	S 32.06	Cl 35.453	
4 First series	K 39.102	Ca 40.08	Sc 44.96	Ti 47.90	V 50.94	Cr 52.20	Mn 54.94	Fe Co Ni 55.85 58.93 58.71
Second series	Cu 63.54	Zn 65.37	—	—	As 74.92	Se 78.96	Br 79.909	
5 First series	Rb 85.47	Sr 87.62	—	Zr 91.22	Nb 92.91	Mo 95.94	Tc 99	Ru Rh Pd 101.07 102.91 106.4
Second series	Ag 107.87	Cd 112.40	In 114.82	Sn 118.69	Sb 121.75	Te 127.60	I 126.90	
6 First series	Cs 132.90	Ba 137.34	La 138.91	Hf 178.49	Ta 180.95	W 183.85		Os Ir Pt 190.2 192.2 195.2
Second series	Au 196.97	Hg 200.59	Tl 204.37	Pb 207.19	Bi 208.98			

• MODERN PERIODIC LAW -

- It is based on the atomic number of elements.
- According to the modern periodic law -
- The properties of the element are periodic function of their atomic number.
- When elements are arranged according to increasing atomic no. there is a periodicity in the electronic configuration. of the element
- Periodicity in electronic configuration of elements leads to the periodicity in their chemical properties.
- Explanation of modern periodic law -
- Properties of elements depends on the number of valence electrons in their atoms.
- When the elements are arranged according to the increasing atomic number, then the elements are having same number of valence electrons occurs at regular intervals.

• The electronic configurations of the elements from lithium to neon and then from sodium to argon which have been arranged according to the increasing atomic number-

Atomic no.	3	4	5	6	7	8	9	10
Elements	Li	Be	B	C	N	O	F	Ne
Electronic confi.	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8
Atomic no.	11	12	13	14	15	16	17	18
Elements	Na	Mg	Al	Si	P	S	Cl	Ar
Electronic confi	2,8,1	2,8,2	2,8,3	2,8,4	2,8,5	2,8,6	2,8,7	2,8,8

• lithium is 3 and its Electronic configuration is 2,1. Thus lithium has 1 valence electron increases from 1 in lithium to 8 in neon.

• Sodium is 11 and its electronic configuration is 2,8,1. Thus sodium has 1 valene electron increases from 1 in sodium to 8 in argon.

• The real significance of the modern periodic classification based on the atomic number is that it relates the periodicity in the properties of elements to the periodicity in their electronic configuration.

• MODERN PERIODIC TABLE-

• The modern periodic table was prepared by Bohr

• All the elements in a particular group of the periodic table have similar properties.

• The arrangement of electrons in the modern periodic table is based on their electronic configuration.

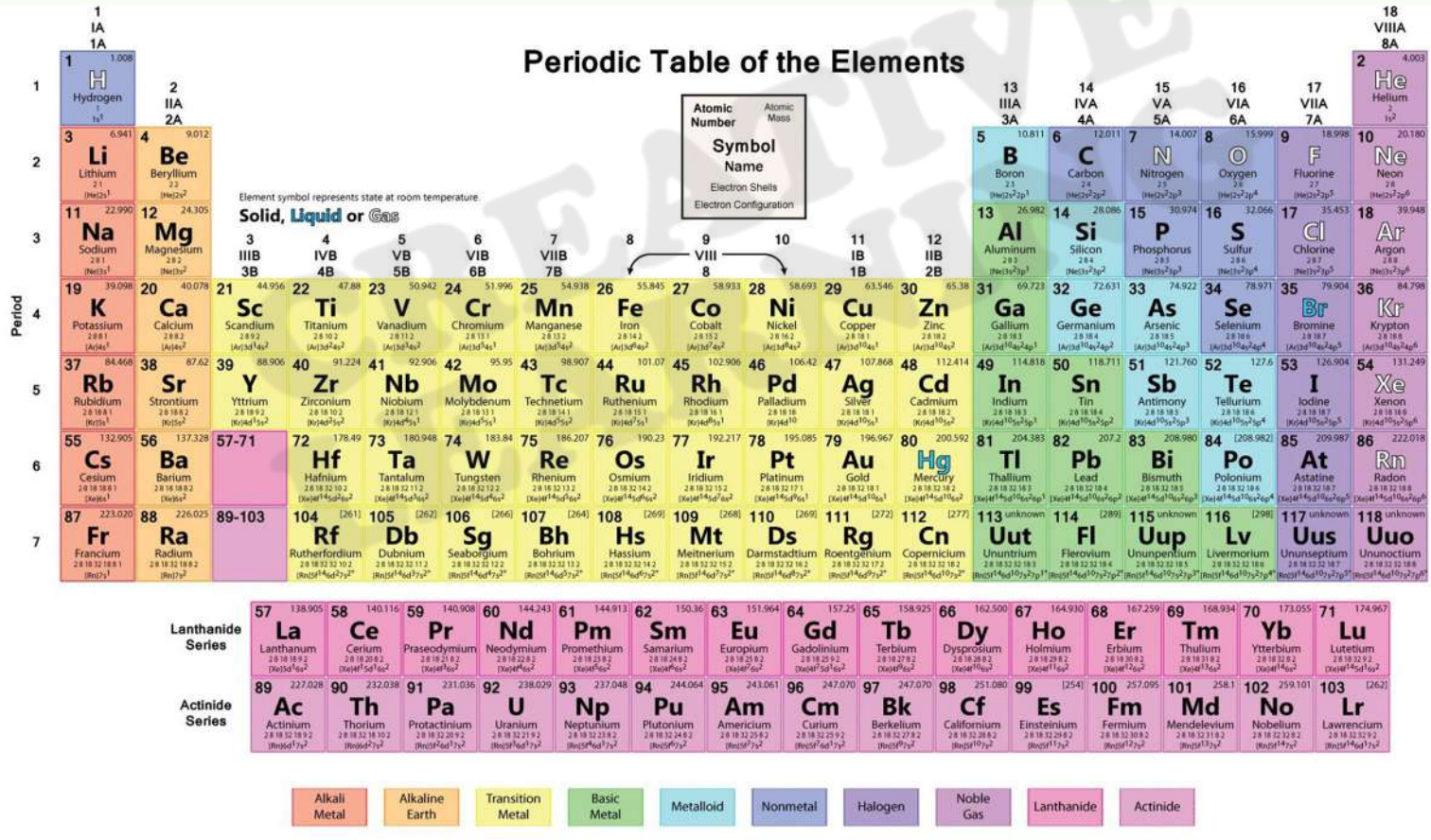
• The horizontal rows of elements in a periodic table are called Periods. There are seven periods in long periodic table.

• The elements in a period have consecutive atomic number.

- 1st period contains 2 element. it is very short period.
- 2nd period contains 8 element. it is called short period.
- 3rd period contains 8 element. it is also a short period.
- 4th period contains 18 element. It is called long period.
- 5th Period contains 18 element It is also called long period.
- 6th Period contains 32 element. It is very long period.
- 7th Period contains 32 element. It is also a very long period.

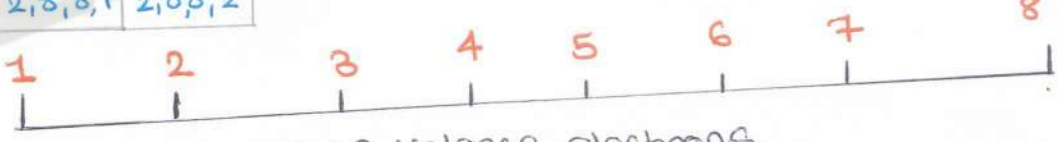
- The number of elements in a period is fixed by the maximum number of electrons which can be accommodated in the various shell of an atom.
- First period has 2 elements bcoz the first shell of the atom can take a maximum of 2 electrons. (K shell).
- The second period has 8 elements bcoz the maximum no. of electrons which can be put in the second shell (L shell) of an is 8 electrons
- First period starts with hydrogen and ends with noble gas helium.
- All the other periods starts with alkali metals like lithium, sodium potassium and end with noble gases like neon, argon and krypton.
- First element of every period has 1 valence electron and last element helium only 2 valence electrons.
- The valence electrons in the atoms of elements that decides, which will be the first element and last element in the period.
- **The vertical columns in a periodic table are called - Groups.**
- There are 18 groups in the long form of periodic table
- element in a group donot have consecutive atomic number.
- The group 1 and 2, 13 to 17 contain normal element, in normal element, all inner shells are completely filled with electrons only outermost shell is incomplete.
- All elements in an a group have similar electronic configuration and show similar properties.
- **All having 1 valence electron in an atom, they show similar chemical properties.**
- **Group 17 contains halogen like fluorine, chlorine, bromine all have 7 valence electrons. all halogen show similar properties.**
- **Group 18 element contains noble gases have 8 valence shells electrons, they are completely filled with electrons Except helium which has only 2 electrons.**
- **Group 3 to 12 elements are called transition element, the outer most shell as well as the next to outermost shell are incomplete and in the process of being filled with electrons.**
- **The elements with atomic number 57 to 71 are called - lanthanide series (because their first element is lanthanium.**
- The elements with atomic number 89 to 103 are called as - actinide series (bcoz their first element is actinide.

- The elements have been roughly divided into -
- Metals • Non metals.
- The elements on the left side of the periodic table are metals.
- The elements on the right side of the periodic table are non-metal.
- Metals have been seprated from non-metals by some element called "metalloids".
- Metalloids are placed diagonally in the periodic table. These are Boron (B), Silicon (Si), Germanium (Ge), Arsenic (As), Antimony (Sb), Tellurium (Te).
- The properties of metalloids are intermediate between those of metals and non-metals.
- Metals lie on left side of metalloid., non metals lie on right side of metalloid. and noble gas are placed on the extereme right side of table.



- Position of Hydrogen-
- Hydrogen element has been placed at the top of group 1. above the alkali metals bcoz the electronic configuration of hydrogen is similar to those of alkali metals.
- Hydrogen atom is very small in size, many properties of H_2 are different from those of alkali metals.
- **Hydrogen is never included in alkali metals.**
- These eight groups are group 1 and 2 and groups 13 to 18.
- Elements having 1 valence electron placed in - Group 1
- Elements having 2 valence electron placed in - Group 2
- Elements having 3 valence electron placed in - Group 13
- Elements having 4 valence electron placed in - Group 14
- Elements having 5 valence electron placed in - Group 15
- Elements having 6 valence electron placed in - Group 16

	Group 1	Group 2	Grp 13	Grp 14	Grp 15	Grp 16	Grp 17	Grp 18
1st period →	H 1							He 2
2nd period →	Li 2,1	Be 2,2	B 2,3	C 2,4	N 2,5	O 2,6	F 2,7	Ne 2,8
3rd period →	Na 2,8,1	Mg 2,8,2	Al 2,8,3	Si 2,8,4	P 2,8,5	S 2,8,6	Cl 2,8,7	Ar 2,8,8
4th period →	K 2,8,8,1	Ca 2,8,8,2						



- NO. OF. Valence electrons.

- **CHARACTERISTICS OF PERIODS-**
- **Valence electrons-** on moving from left to right in a period, the number of valence electrons increase from 1 to 8.

Element of third period	11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
Electronic configuration	2,8,1	2,8,2	2,8,3	2,8,4	2,8,5	2,8,6	2,8,7	2,8,8
No of valence electrons	1	2	3	4	5	6	7	8

- The first element in every period has 1 valence electron and last element in every period has 8 valence electrons.
- The elements in a period have consecutive atomic numbers. For example - elements in the third period from sodium to argon have continuous element number from 11 to 18.

- **Valency-**
On moving from left to right in each short period, the valency of elements from 1 to 4 and then decreases to 0 (zero).

Third period	Na	Mg	Al	Si	P	S	Cl	Ar
Valency -	1	2	3	4	3	2	1	0

- Elements in the same period have diff. valency.
- The valency of an element is determined by the number of valence electrons present in the atom.
- **The valency of an element is determined by the no. of e^-'s lost or gain by one atom of an element to achieve the nearest inert gas electron configuration.**
- Example- The atomic number of magnesium is 12, so its electronic configuration is 2,8,2. A magnesium atom can lose its 2 valence electron to achieve the nearest inert gas confi. 2,8 (neon), so its valency is 2.

- **Atomic size-** The size of the an atom is known as atomic size. It is also refer to as atomic radius of atom.
- The size of an atom is the distance between the center of nucleus and outer most electron shell of an isolated atom.
- Atomic radius is expressed in 'picometre' unite whose symbol is 'pm'. $1pm = 10^{-12}\ m$

- **Size of atoms -**
- **On moving from left to right in a period, the size of atoms decrease**

Third period element	Na	Mg	Al	Si	P	S	Cl
Atomic radii (Pm)	186	160	143	118	110	104	99

- decreases

- Due to large positive charge on the nucleus, the electrons are pulled in more closed to the nucleus and the size of atom decreases.
- Alkali metal atom - Biggest in size, Halogen atom - smallest in size
- The size of atom of an inert gas is bigger than that of the preceding halogen atom. bcoz due to the structural stability of its outermost shell consisting an octet of electrons

- **Metallic character -**
- on moving from left to right the metallic character - decreases
non metallic character - increases.

Third period	Na	Mg	Al	Si	P	S	Cl
Nature of element	Metal			Metalloid	Non-metal		

- Greatest → left side • Metallic character - decreases
→ right side • Non metallic character - increases

- Metals lose electrons and forms positive ions, so metals called Electro positive elements.
- Non metals accept electrons to forms negeative ions, so non-metals called Electronegative elements.
- left to right - Electro positive element - decreases
Electro negative element - increases

- Sodium is the most electro positive element, whereas Chlorine is most electronegative element.
- **On moving from left to right in period, the tendency of atoms to lose electron decreases.**
- On moving from left to right in a period, the tendency in a period, the tendency of atoms to gain electron increases.
- ↑ nuclear charge - the valence electrons are pulled more strongly by nucleus. and it becomes more and more difficult for atoms to lose electrons. due to increased nuclear charge, it becomes easier for the atoms to gain electrons.

• **Chemical Reactivity** - moving left to right in a period, the chemical reactivity of elements first decreases and then increases.

Na	Mg	Al	Si	P	S	Cl

• Chemical reactivity: very reactive — least reactive — very reactive

Decreases → Increases.

• The variation in chemical reactivity of element in a period can explained as-

• Sodium, there is 1 valence electron which it can lose easily to react with other substance so it is very reactive.

• Chlorine has 7 valence electron which it need to gain 1 electron to get stable, but it is very easy to gain a electron so reactivity increases from Phosphorus to Chlorine.

• **Nature of oxides-**

On moving left to right - the basic nature of oxides decreases and acidic nature of oxides increases.

Na	Mg	Al	Si	P	S	Cl

Highly basic — Amphoteric — Highly acidic

• Basic nature – decreases

• Acidic nature – increases

• Sodium oxide is highly basic in nature.

• Magnesium oxide is less basic

• Aluminium and silicon are amphoteric in nature.

• chlorine are highly acidic in nature

• Basic nature - ↓↓ Acidic nature - ↑↑

- **CHARACTERISTICS OF GROUP -**
- **Valence electrons -**
- All the elements of group 1 of the periodic table have the same of valence electrons - like lithium, sodium and potassium.
- The atoms of group 1 elements lithium, sodium, potassium ions like Li^+, Na^+ and K^+ having 1 unit positive charge.
- **So, group 1 elements are monovalent** (having valency 1).
- Moving down in a particular group of the periodic table, the number of valence electrons remains the same.

Group		Electronic configuration	No. of valence e⁻'s.
lithium	Li	2, 1	1
sodium	Na	2, 8, 1	1
potassium	K	2, 8, 8, 1	1

- **All the elements of group 2 have 2 valence electrons in an atom**
- Bereyllium, magnesium and calcium of group 2 has 2 valence e⁻s' in their atoms.
- Atoms of group 2 elements bereyllium, magnesium and calcium can lose their 2 valence electrons easily to form positive ions Be^{+2}, Mg^{+2}, Ca^{+2} so group 2 are divalent

Group 2		Electronic configuration	No. of valence e's.
Beryllium	Be	2, 2	2
magnesium	Mg	2, 8, 2	2
calcium	Ca	2, 8, 8, 2	2

- All the elements of group 17 has 7 valence electrons each in their atom, Halogen element of group 17 like Fluorine, chlorine bromine and iodine have 7 valence electrons. so group 17 accept 1 electron easiy to complete its octet and form negative ions like F^-, Cl^-, Br^- and I^- having 1unit of negative charge.

So, group 17 elements are - monovalent and form electronegative elements.

	Group 17	Electronic configuration	No. of. Valence electrons
Fluorine	F	2, 7	7
chlorine	Cl	2, 8, 7	7
Bromine	Br	2, 8, 18, 7	7
Iodine	I	2, 8, 18, 18, 7	7

- All the elements of group 18 have 8 valence electrons, except He which has only 2 valence electrons in its atom. the outermost shells of an atom of group 18 elements are already completely filled with electrons. These elements have no tendency to lose or gain electrons. due to this element of group 18 are zerovalent. and unreactive.
- If some elements have the same number of electrons in the outermost shell of their atoms, then they belong to the same group of the periodic table.
- The group number of elements having up to two valence electron is equal to the number of valence electrons.
- If number of valence electrons is 1, then group number is 1.
- If number of valence electrons is 2, then group number is 2.
- The group number of elements having up to two valence electron is equal to the number of valence electrons plus 10.
- If number of valence electrons is 3, then group number is 3+10=13
- If number of valence electrons is 4, then group number is 4+10=14
- If number of valence electrons is 5, then group number is 5+10=15
- If number of valence electrons is 6, then group number is 6+10=16
- If number of valence electrons is 7, then group number is 7+10=17
- one exception to this rule. The noble gas 'helium' has 2 valence electrons, but its group number is 18.

	Group 18	Electronic configuration	No. of valence electrons
Helium	He	2	2
Neon	Ne	2, 8	8
Argon	Ar	2, 8, 8	8
Krypton	Kr	2, 8, 18, 8	8

- Valency-
- The number of valence electrons in a group in the same, all the elements in a group have the same valency.
- Group 1 element like lithium, sodium and potassium all have 1 valence electron each, so all the elements of group 1 have the same valency of 1.
- The maid of the periodic table and the valency-
- Valency of group 1 element is 1.
- Valency of group 13 element is 3.
- Valency of group 14 element is 4.
- Valency of group 15 element is 3.
- Valency of group 16 element is 2.
- Valency of group 17 element is 1.

- Size of atoms-
- On going down in a group of the periodic table, the size of the atom increases.
- For example-when we move down from top to bottom in group 1 of alkali metals, then size of atoms increases graudually from lithium to francium.
- Smallest atomic size will be found at the top of a group.
- largest atomic size is found in the lowest part of a group.
- Li is at the top - smallest atom
- Fr is at the bottom - Biggest atom.
- Potassium atom - Biggest atom.

Group 1	
lithium	Li
sodium	Na
Potassium	K
Rubidium	Rb
cesium	Cs
Francium	Fr

Atomic radii (pm)

152	Li	smallest atom
186	Na	
231	K	
244	Rb	
262	Cs	
270	Fr	Biggest atom

Group 17		(pm)	
• Fluorine	F	64	F
• chlorine	Cl	99	Cl
• Bromine	Br	114	Br
• Iodine	I	133	I

smallest atom.

Biggest atom

- Increase in size of the atoms on moving from top to bottom in a group of the periodic table - when we move from top to bottom in a group, a new shell of electrons is added to the atom at every step.
- The number of electron shell in the atom increase gradually due to which the size of atom increases.
- The decrease in size of atom due to increased attraction between nucleus and electrons is much less as compared to the increase attraction between nucleus and electron and increase in size due to the addition of an extra shell of electrons.
- The size of atom increase on going down in the group. In group 17 of halogens the atomic size increases on going down from fluorine to iodine.

- Fluorine atom is the smallest, iodine atom is the largest in size.

- Metallic Reactivity-
- on going down in a group of the periodic table, the metallic character increases.
- The metallic character increases from lithium to francium
- The greatest metallic character is found in the elements in the lowest part of a group.
- on going down in a group of periodic table, the electro positive character of element increases.

• lithium is least electropositive element and Francium is the most electropositive element. as we move down in a periodic table one more shell is added at every stage and size of atom increases.
• The valence electrons become more and more away from nucleus on valence electrons decreases.
• Due to this the atom can lose valence electrons more easily to form positive ions and hence the electropositive character increases.

• ongoing dow the non-metallic character of element decrease-
• Fluorine is an- most electronegative element.
• Jodine is an- least electronegative element.

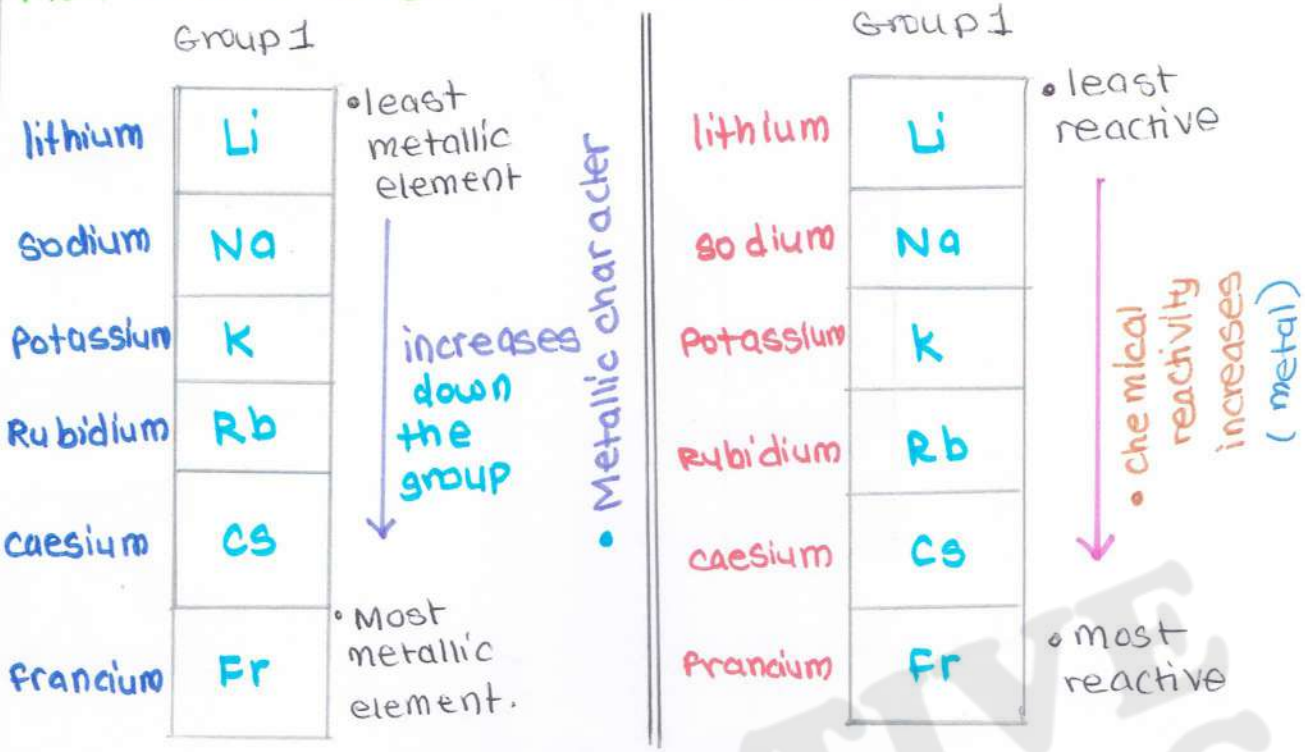
bcoz - as we move down one more shell is added to every atom and size of atom goes on increasing
• the attraction of nucleus for the incoming electron decreases due to which, the atom cannot form negative ions. easily and electronegative character decreases.
• Francium - most electropositive element, Fluorine- most electronegative element.

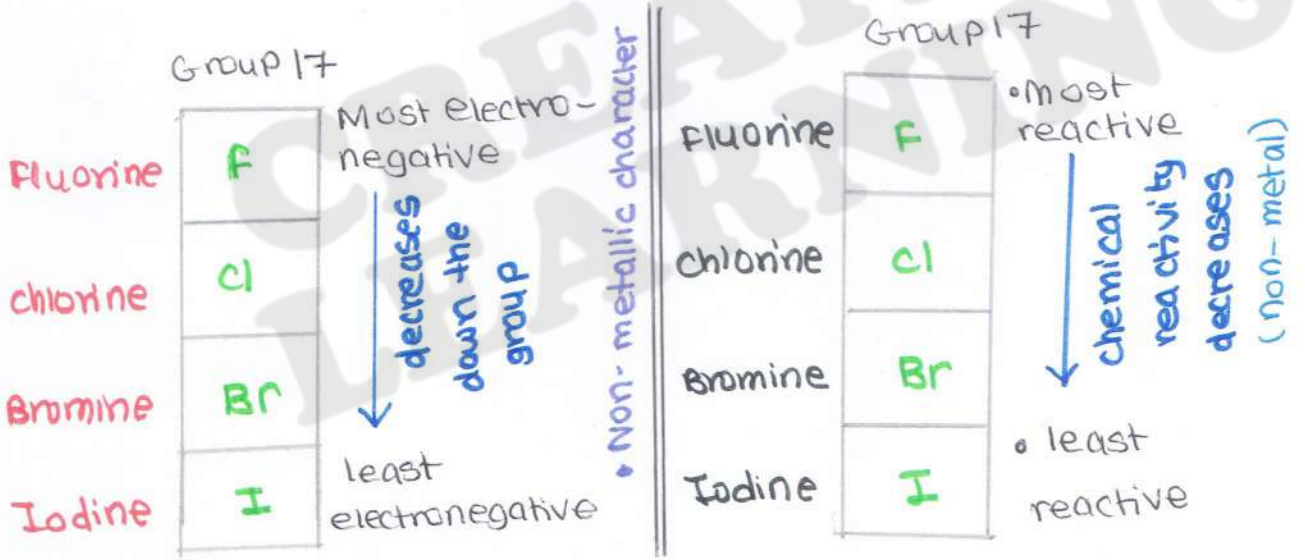
• Chemical Reactivity-
• The chemical reactivity goes on increaseing on going down in a group.
• Li is the least reactive alkali, Fr is the most reactive alkali metal. bcoz as we move down in a group, the size of the atom goes on increasing.
• Due to increase in size of atom, the valence electrons of metal atom become more and more away from the nucleus and hence removed easily.
• As we move down in group of metals the tendency of (lose) atom to lose electrons and chemical reactivity increases.
• The order of reactivity of non- metals in a group just the opposite to that of metals.

• The chemical reactivity of non- metals decreases on going down in the group-
• In group 17, the chemical reactivity decreases from fluorine to iodine.
• Fluorine - most reactive, Jodine - least reactive.
• As we move down in a group of non- metal, the atom size goes on increasing. due to increase in size, the nucleus of atom

goes more and more deep inside it and hence its attraction for incoming electrons decreases.

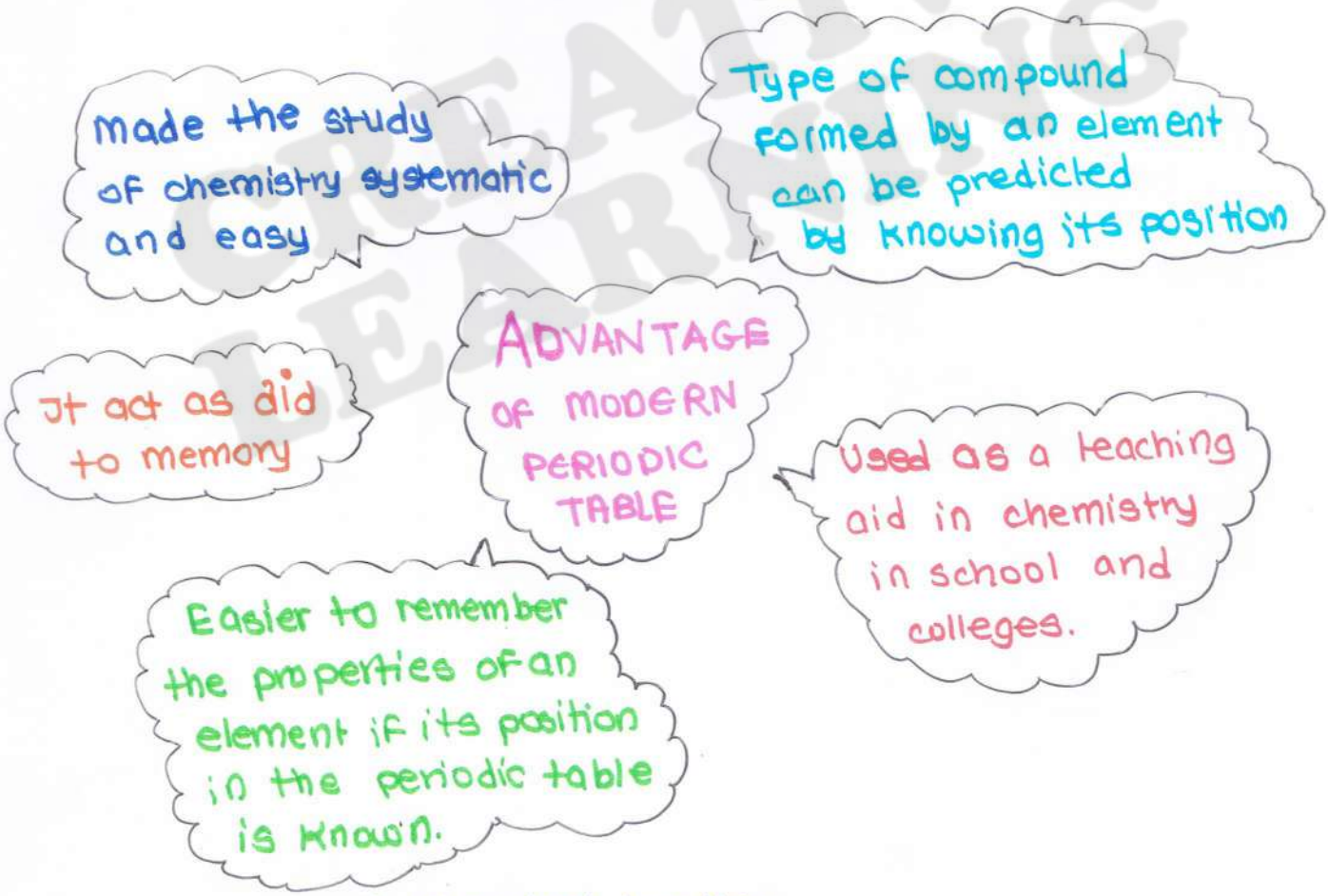
- As we go down, the group of non-metals, the tendency of their atoms to gain electrons decreases.





- Nature of oxides —
- on going down the group, the periodic there is no change in nature of oxides. the nature of oxides of all element of a group is same.
- All group 1 element form - Basic oxides
- All group 17 element form - Acidic oxides.

- **Merits of modern periodic table -**
- The table is based on the atomic number of the element which is most fundamental property of element.
- It help us to understand why element in a group show similar properties but elements in different groups show different properties. its brings about the relationship between atomic structure and properties of element.
- The modern table explains the reasons for the periodicity of properties of the element. the electronic configuration of elements are repeated at regular intervals, so the properties of elements also increases or repeated at interval.
- It tells us why the properties of element are repeated after 2, 8, 18 and 32 elements.
- There are no anomalies in arrangement of elements.



- **Periodic table and chemical bonding -**
- When a nonmetal combines with metal, transfer of electrons takes place from metal atom to nonmetal atom then an ionic bond is formed.

- when an element from left side combines with right side of the element, then - ionic bond is formed.
- An element group 1, 2 or 13 combines with an element from group 14, 15, 16 or 17 an ionic bond is formed.
- when an element from right side combines with left side of the element then - covalent bond is formed.
- whenever two element from group 14, 15, 16 and 17 combine together covalent bond is formed

- THANK YOU !!!

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