PROPERTIES OF MODERN PERIODIC TABLE

1. ~~Periodicity~~
2. Atomic Size
3. Metallic Nature
4. Non-Metallic Nature
5. Reactivity.
6. Valence e^-
7. Valency
8. Ionisation Potential
9. Electron affinity
10. Electron negativity
11. Boiling Point
12. Melting Point
13. Oxidising Nature
14. Reducing Nature.
15. Nuclear charge

1. **Periodicity**

Recurring trends in the physical & chemical prop. of elements arranged in the P.T, as a consequence of the same no. of valence e^-.

2. **Atomic Size**

The distance b/w the centre of the nucleus of an atom to the outer-most shell.

aka atomic radius

TREND

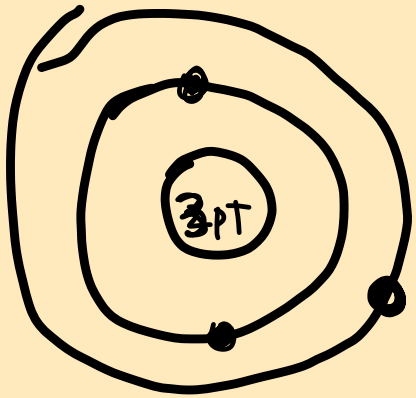
(a) Down a Group :- ↑ because the number of shells ↑ down the group.

⑥ **Across a Period** :

- Atomic size decreases.
- **BECAUSE** the no. of p^+ in the nucleus ↑ as we move from left to right in a period (due to ↑ in the atomic number)
- Thereby increasing the pull/force of attraction b/w nucleus & the outermost shell.

Eg

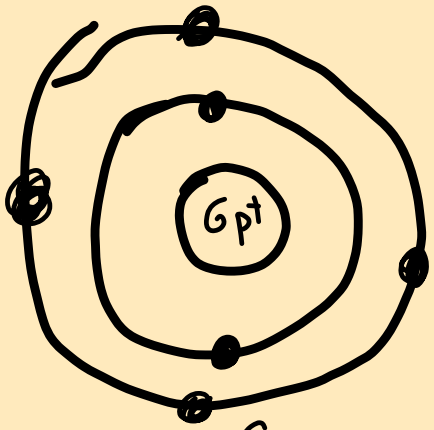
Period 2	Li	Be	B	C	N	O	F	Ne
	2,1	2,2	2,3	2,4	2,5	2,6	2,7	2,8



Li

$3e^-$

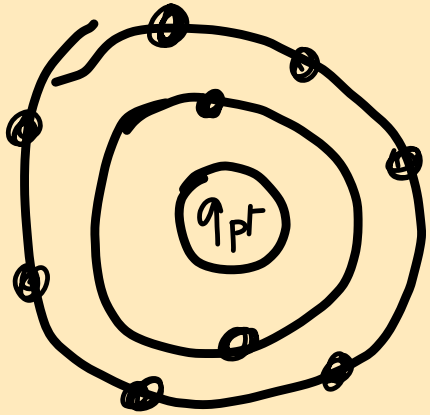
3pT



C

$6e^-$

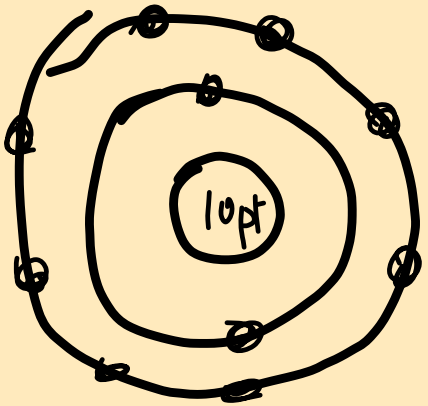
6 pT



F

$9e^-$

9 pT



Ne

$10e^-$

10 pT

* Factors on which Atomic Size depends

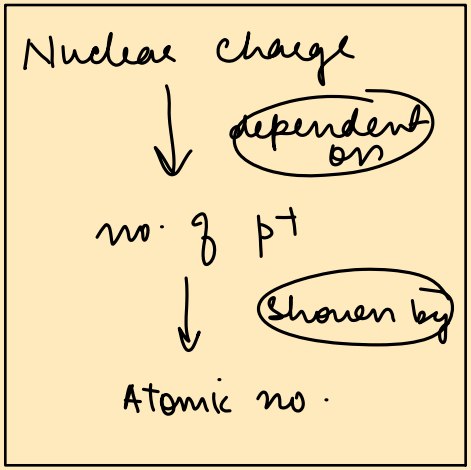
↳ No. of shells

↳ Nuclear charge.

© **Nuclear charge**

The total +ve charge present in the nucleus of an atom is called Nuclear charge.

Trend :-



(i) **Down a Group** :- * It **increases** abruptly

(because the no. of p+ increase down a group)

Eg:- 1, 3, 11, 19, 37 (atomic no. of Group I elements)

(ii) **Across a Period** :- It **increases** gradually. (one by one)

[no. of p+ increase by 1 left to right across a period]

(d) Metallic Nature :-

1. Metals tend to → lose e^- (aka "electron donors") & become electropositive } to achieve octet.

(eg) Na 2,8,1 { $-1e^-$
Mg 2,8,2 { $-2e^-$
Al 2,8,3 { $-3e^-$

2. **Metallic Nature** is the elements having a tendency of donating e^- to form electropositive ions are known as metals.

Trend

(i) Down a Group :- The metallic nature increases due to increase in atomic size. The force of attraction b/w the nucleus & the outermost shell decreases, so the tendency to lose e^- increases.

(ii) Across a Period :-

↳ It decreases

↳ as the nuclear pull increases

↳ ∴ force of attraction b/w the nucleus & valence e^- increases.

* Factors on which Metallic nature depends

1. Atomic size

2. Nuclear charge

ⓒ Non-Metallic Nature

* Note :- Non metals → gain e^- & become electro negative ions (aka "$\bar{e}$ acceptors")

Eg:-

Cl : 2, 8, 7	$+1\ e^-$	to achieve octet.
P 2, 8, 5	$+3\ e^-$	
S 2, 8, 6	$+2\ e^-$	

1.) The elements having a tendency to accept $\bar{e}$ to form electronegative ions aka non-metals.

2.) Trends.

ii) Down a Group

↳ atomic size increases

↳ ∴ nuclear pull decreases → so

tendency to accept e^- decreases

↳ ∴ non-metallic nature **DECREASES**

(iv) **Across a Period**

↳ nuclear charge increases (+ve charge)

↳ ∴ tendency to accept e^- (-ve charge) increases

↳ ∴ non-metallic nature **INCREASES**

* Factors on which non-metallic nature depends

(1.) Atomic size

(2.) Nuclear charge