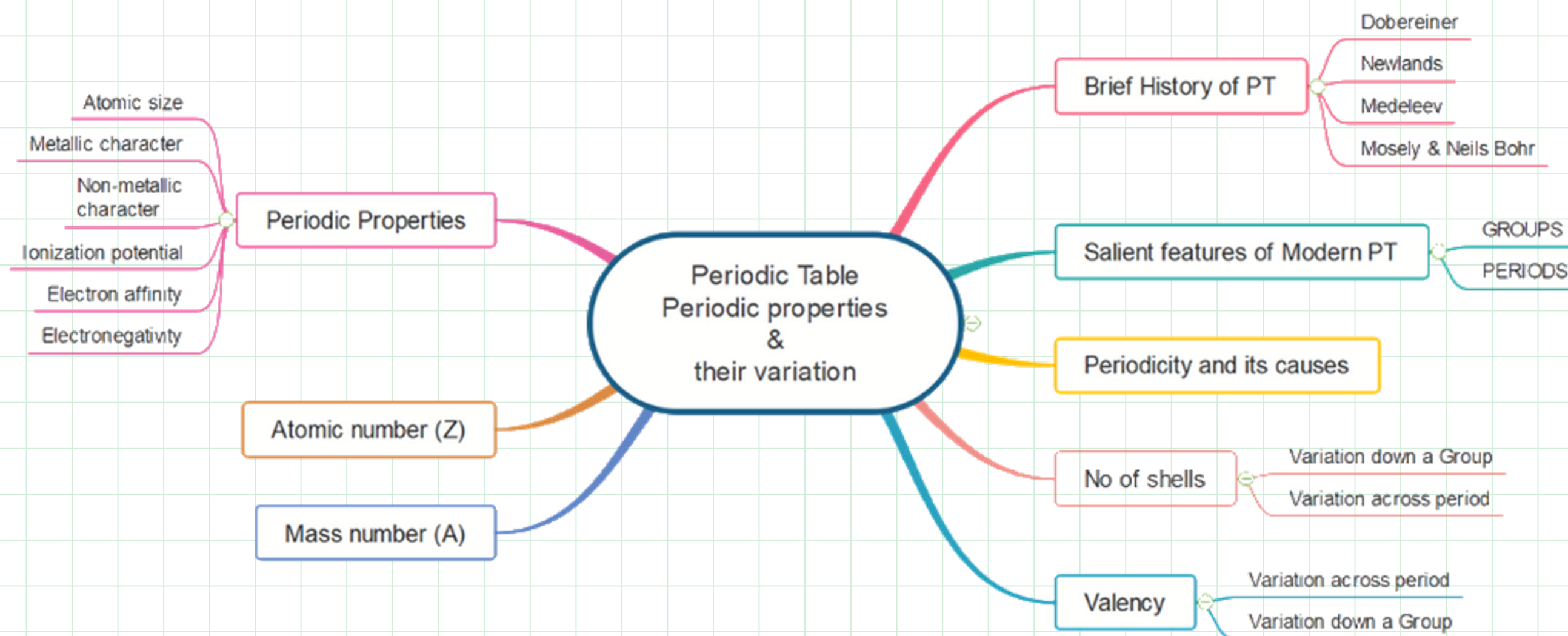


PERIODIC TABLE, PROPERTIES & VARIATION

Mind Map



Shells (Orbits) and Valency

Shells

- Down a group, No. of shells increase (by 1)
- NOTE: The number of shells in any element equals the period to which it belongs.

Ex: Elements of Period 2 have 2 shells
" 6 " 6 shells etc.

- Across a period, the no. of shells remain constant.

Ex: All Elements of Period 3 from left to right have 3 shells.

Valency

Def.ⁿ: Valency denotes the combining capacity of an atom of an element. It is equal to the number of electrons it can lose, gain or share to achieve stability.

Down a group: Valency remains constant.

Ex: For group 1 elements Li, Na, K, Rb, Cs, Fr all have 1 valence electron, hence valency = 1.

- ## Trends in Chemical reactivity

Across period

- Chemical reactivity from left to right first decreases, then increases.

Reason: Metallic character i.e. tendency to lose e^- reduces across period.

Ex: In Period 3, reactivity reduces upto Si after which tendency to gain electron i.e non-metallic character increases from Phosphorus to Chlorine.

	1A																	8A	
1	H	2A																	He
2	Li	Be											B	C	N	O	F	Ne	
3	Na	Mg	3B	4B	5B	6B	7B	8B			1B	2B	Al	Si	P	S	Cl	Ar	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
6	Cs	Ba			Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra			Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Tn	Og
			57	58	59	60	61	62	63	64	65	66	67	68	69	70	71		
			La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
			89	90	91	92	93	94	95	96	97	98	99	100	101	102	103		
			Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

Down a group

- Reactivity increases down a group for metals

Reason: Down the group metallic character increases

- Reactivity in non-metals decreases down a group.

Reason: Down the group, atomic size $\uparrow \Rightarrow$ difficult to gain e^-

Non-metallic Character

It is tendency of elements to gain electrons.

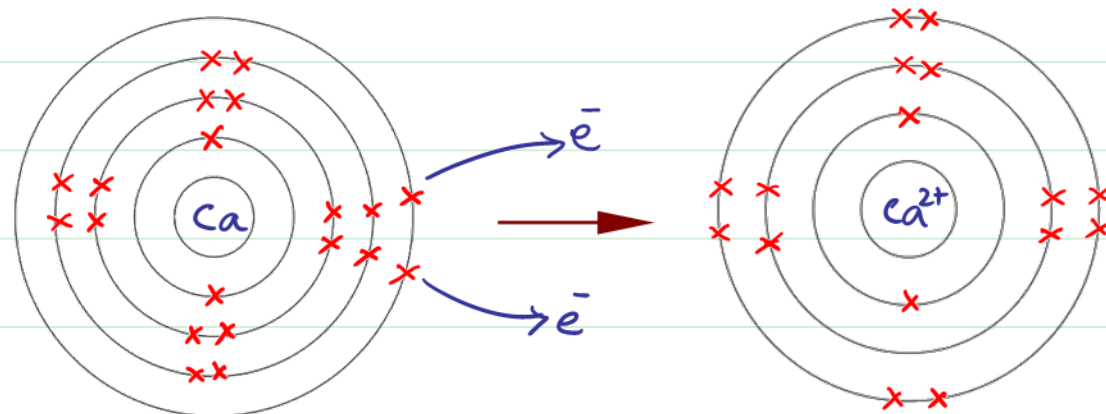
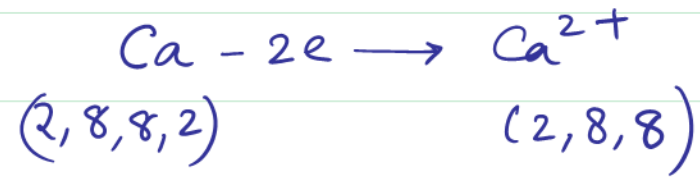
- Non metals usually have 5, 6 or 7 valence electrons and gain 3, 2 or 1 electrons to complete Octet state.

- Factors affecting Non-metallic character

(i) Atomic size $\rightarrow$ As At. size $\uparrow$, Non-metallic nature $\downarrow$

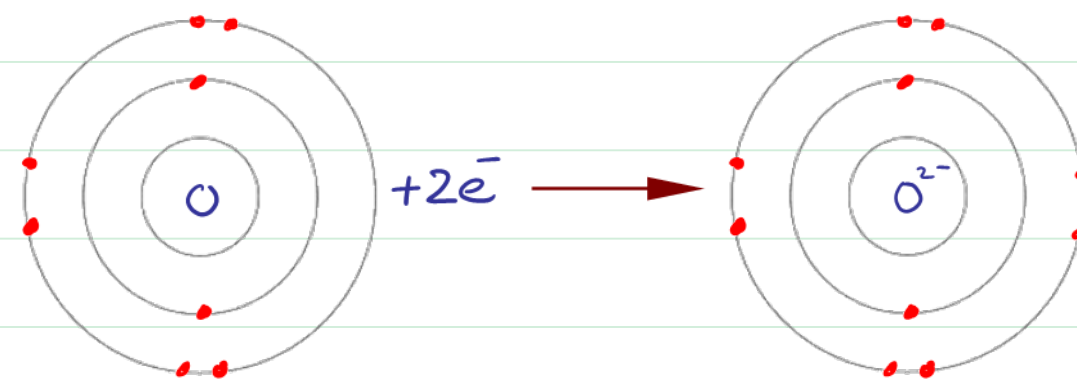
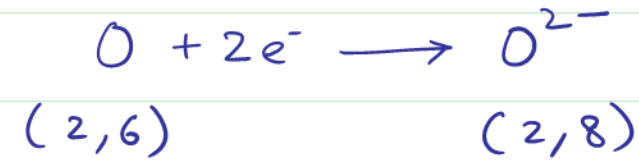
(ii) Nuclear charge $\rightarrow$ As Nuclear charge $\uparrow$, " " " $\uparrow$

Calcium oxide CaO



Calcium atom
(2, 8, 8, 2)

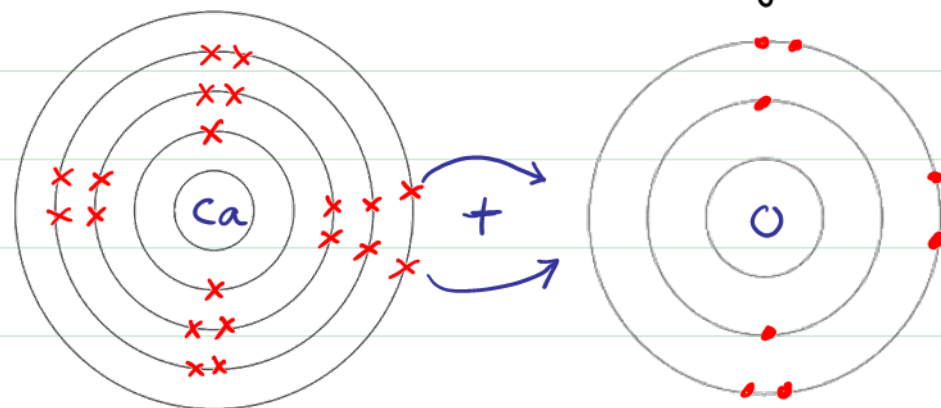
Calcium ion
(2, 8, 8)



Oxygen atom
(2, 6)

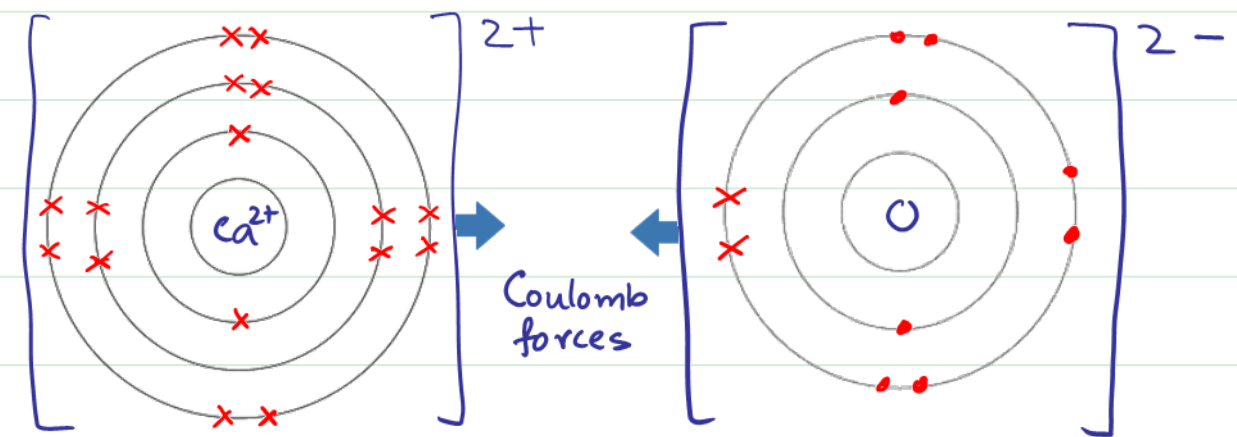
Oxide ion
(2, 8)

Atomic or Orbit Structure Diagram



Calcium atom
(2, 8, 8, 2)

Oxygen atom
(2, 6)



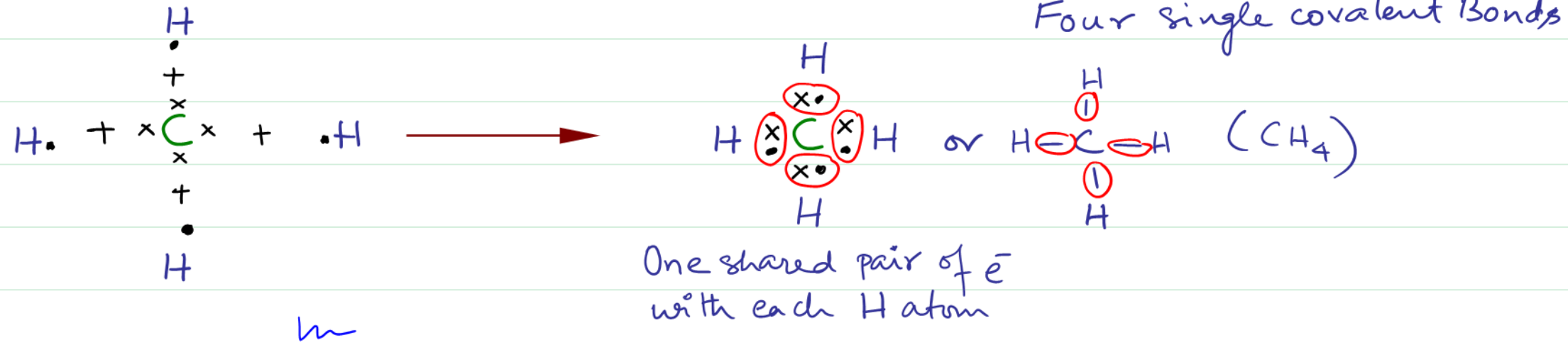
Calcium ion
(2, 8, 8)

Oxide ion
(2, 8)

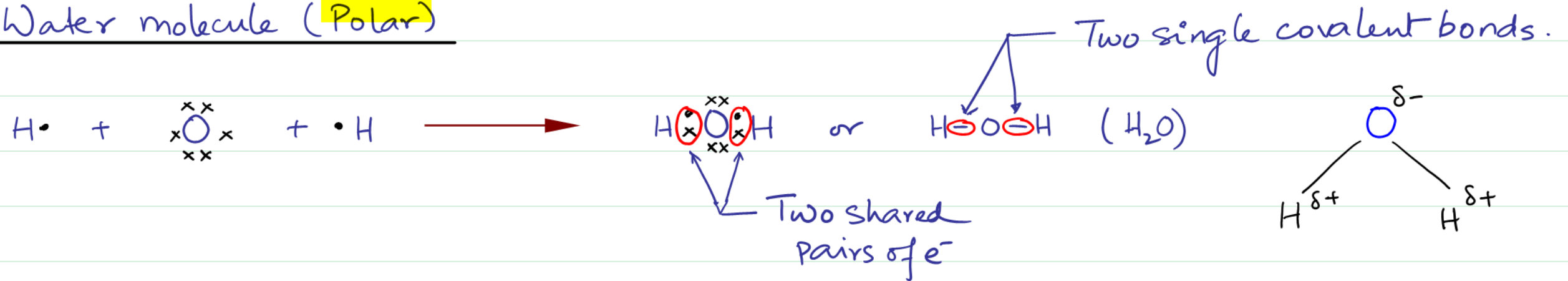
Electron dot or Lewis symbol



5. Methane (Non polar)



6. Water molecule (Polar)



7. Ammonia (Polar)

