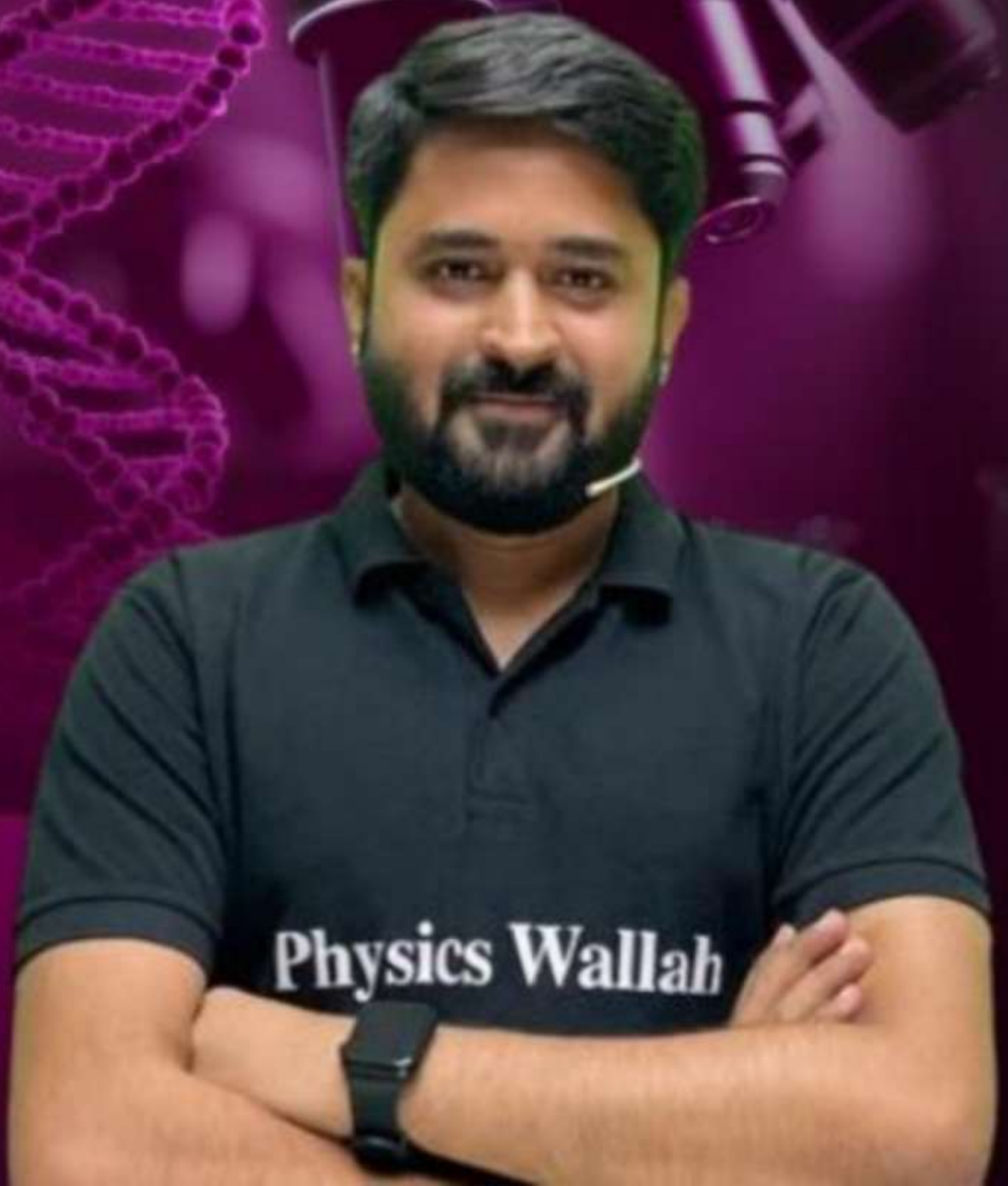
PRACHAND NEET

ONE SHOT

Inorganic Chemistry

Classification of Elements and Periodicity in Properties



By – Hitesh Sopra Sir

Topics *to be covered*

1. Periodic Table One Shot

s-block
p-block
d-block
f-block
32 elements
3 IIIB
1s¹
2s² 2p⁶
3s 3p
4s 3d 4p
He
1 IA 1A
2 IIA 2A
13 IIIA 3A
14 IVA 4A
15 VA 5A
16 VIA 6A
17 VIIA 7A
18 VIIIA 8A
3 IIIB 3B
4 IVB 4B
5 VB 5B
6 VIB 6B
7 VIIB 7B
8 VIIIB 8B
9 VIIIB 8B
10 VIIIB 8B
11 IB 1B
12 IIB 2B
1 H Hydrogen
2 He Helium
3 Li Lithium
4 Be Beryllium
5 B Boron
6 C Carbon
7 N Nitrogen
8 O Oxygen
9 F Fluorine
10 Ne Neon
11 Na Sodium
12 Mg Magnesium
13 Al Aluminium
14 Si Silicon
15 P Phosphorus
16 S Sulfur
17 Cl Chlorine
18 Ar Argon
19 K Potassium
20 Ca Calcium
21 Sc Scandium
22 Ti Titanium
23 V Vanadium
24 Cr Chromium
25 Mn Manganese
26 Fe Iron
27 Co Cobalt
28 Ni Nickel
29 Cu Copper
30 Zn Zinc
31 Ga Gallium
32 Ge Germanium
33 As Arsenic
34 Se Selenium
35 Br Bromine
36 Kr Krypton
37 Rb Rubidium
38 Sr Strontium
39 Y Yttrium
40 Zr Zirconium
41 Nb Niobium
42 Mo Molybdenum
43 Tc Technetium
44 Ru Ruthenium
45 Rh Rhodium
46 Pd Palladium
47 Ag Silver
48 Cd Cadmium
49 In Indium
50 Sn Tin
51 Sb Antimony
52 Te Tellurium
53 I Iodine
54 Xe Xenon
55 Cs Caesium
56 Ba Barium
La
72 Hf Hafnium
73 Ta Tantalum
74 W Tungsten
75 Re Rhenium
76 Os Osmium
77 Ir Iridium
78 Pt Platinum
79 Au Gold
80 Hg Mercury
81 Tl Thallium
82 Pb Lead
83 Bi Bismuth
84 Po Polonium
85 At Astatine
86 Rn Radon
87 Fr Francium
88 Ra Radium
Ac
104 Rf Rutherfordium
105 Db Dubnium
106 Sg Seaborgium
107 Bh Bohrium
108 Hs Hassium
109 Mt Meitnerium
110 Ds Darmstadtium
111 Rg Roentgenium
112 Cn Copernicium
113 Nh Nihonium
114 Fl Flerovium
115 Mc Moscovium
116 Lv Livermorium
117 Ts Tennessine
118 Og Oganesson
119 Uue Ununennium
120 Ubn Unbinilium
121 Ubu Unbiunium
Lanthanides
57 La Lanthanum
58 Ce Cerium
59 Pr Praseodymium
60 Nd Neodymium
61 Pm Promethium
62 Sm Samarium
63 Eu Europium
64 Gd Gadolinium
65 Tb Terbium
66 Dy Dysprosium
67 Ho Holmium
68 Er Erbium
69 Tm Thulium
70 Yb Ytterbium
71 Lu Lutetium
Actinides
89 Ac Actinium
90 Th Thorium
91 Pa Protactinium
92 U Uranium
93 Np Neptunium
94 Pu Plutonium
95 Am Americium
96 Cm Curium
97 Bk Berkelium
98 Cf Californium
99 Es Einsteinium
100 Fm Fermium
101 Md Mendelevium
102 No Nobelium
103 Lr Lawrencium
Alkali metals
Alkaline earth metals
Lanthanides
Actinides
Transition metals
Post-transition metals
Metalloids
Reactive nonmetals
Halogens
Noble gases
Unknowns

Lanthanoids

$_{57}La \Rightarrow (_{58}Ce \text{ - - - - - - } _{71}Lu)$

$_{89}Ac \Rightarrow (_{90}Th \text{ - - - - - - } _{103}Lr)$

INTRODUCTION

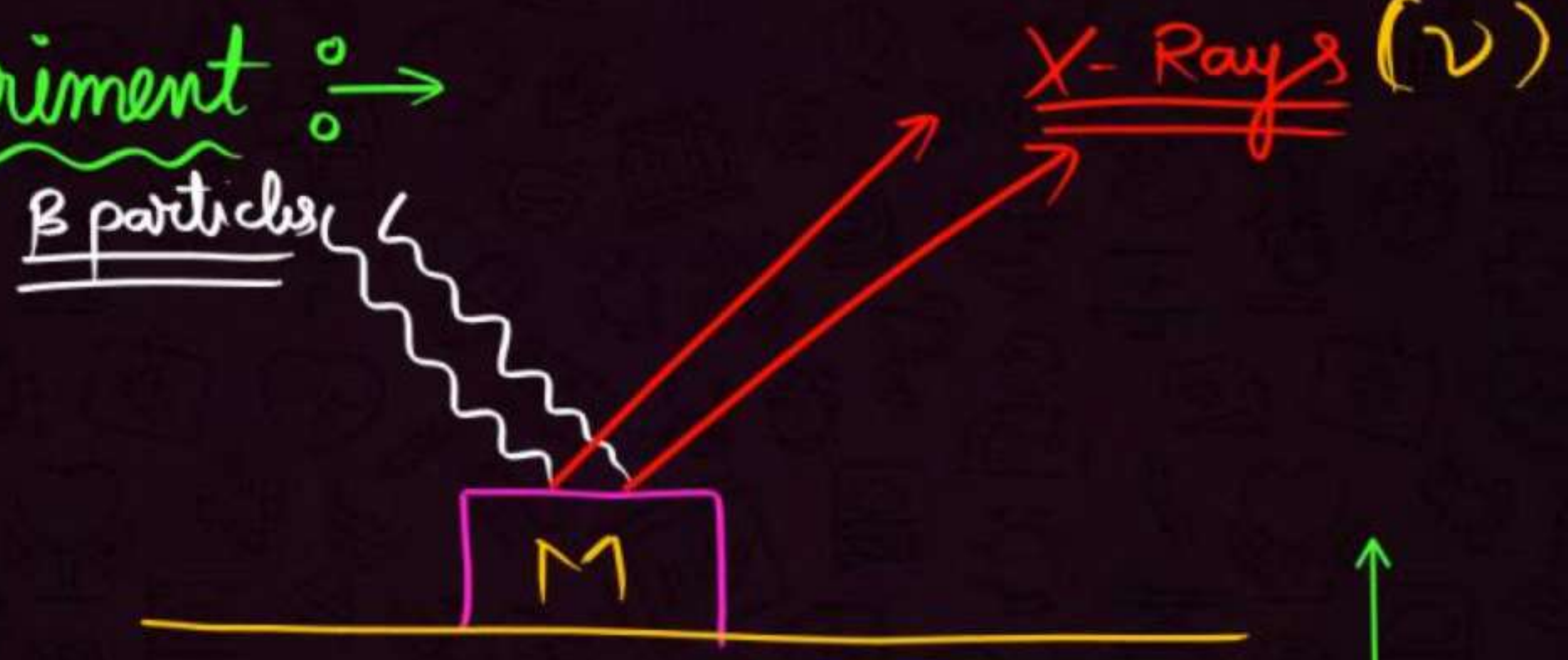
It is a systematic arrangement of all known elements in increasing order of their atomic No. (z) in horizontal rows (periods) & vertical columns (groups) so that the properties of the elements can be studied easily.

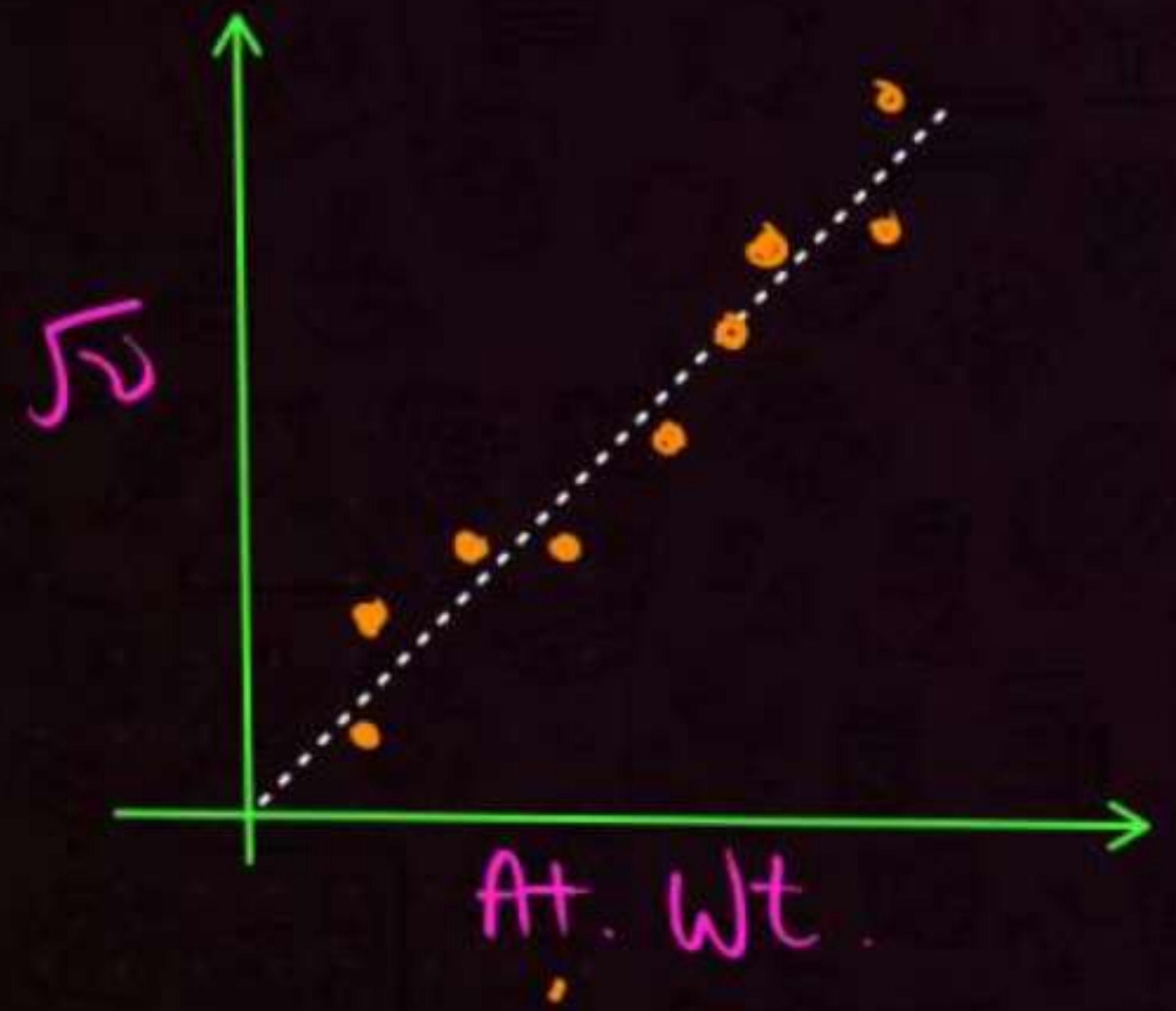
* Mendeleev's Periodic Law :-

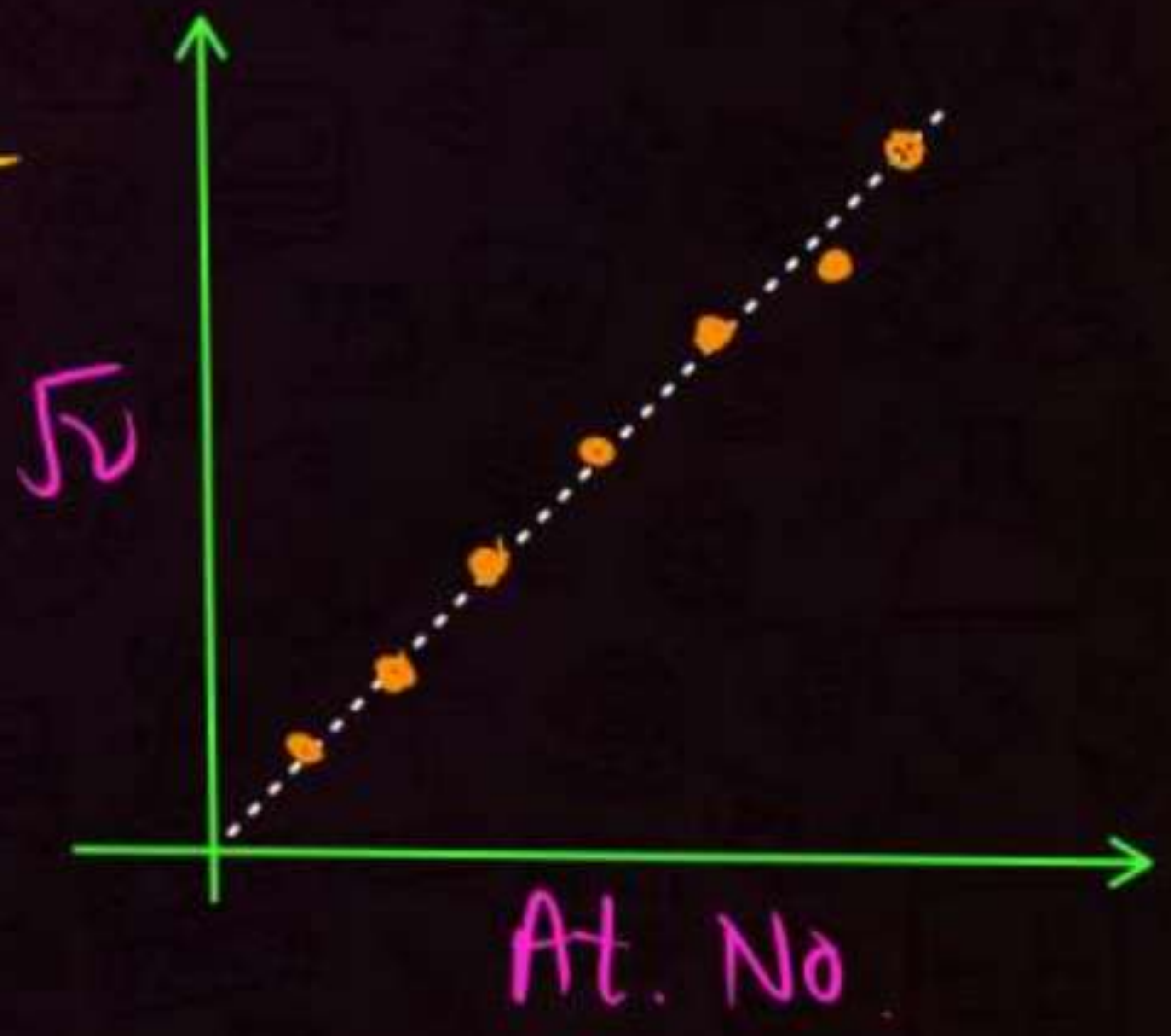
Physical & Chemical properties of the elements are periodic function of their Atomic Weight.

MODERN PERIODIC TABLE

* Mosely's Experiment :→







* Modern Periodic Law :-

Physical & Chemical properties of the elements are periodic function of their Atomic Numbers.

LONG FROM PERIODIC TABLE

periods = 7

Groups = 18 (1 to 18)

Blocks = 4 (s, p, d, f)

* Representative Elements :⟶ all s & p-block elements including Noble gases are c/d Representative Elements.

(Acc. to New NCERT)

* **Transition Elements** :→ d-block elements (except group-12) are c/d transition elements.

* **Note** → (n-1)d subshell incomplete either in their ground state or any stable oxidation state.

General e⁻ config of d-block Elements : $ns^{1-2}(n-1)d^{1-10}$ ✓

Pd :→ $[Kr]\,5s^0\,4d^{10}$

Q No. of transition elements in Long form periodic Table?

(1) 40 (2) 30 (3) 36 ✓ (4) 32

$Zn \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 4s^{2 \rightarrow 0} 3d^{10}$ $(n-1)d$

$Zn^{+2} \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$ $(n-1)d$

$Fe \rightarrow [Ar]\, 4s^2 3d^6$

$Mn \rightarrow [Ar]\, 4s^2 3d^5$

$Cu^0 \rightarrow [Ar]\, 4s^1 3d^{10}$

$Cu^{+2} \rightarrow [Ar]\, 4s^0 3d^9$ incomplete

* Inner transition Elements :- f-block Elements

* NEET 2025 *

General e^- config $\Rightarrow$ $ns^2 (n-1)d^{0-1} (n-2)f^{1-14}$

General Configuration Of a Period :

$$ns \ (n-2)f \ (n-1)d \ np$$

$n = 1 \Rightarrow 1s$ ~~1p~~

$n = 2 \Rightarrow 2s$ ~~1d~~ $2p$

$n = 3 \Rightarrow 3s$ ~~1f~~ ~~2d~~ $3p$

$n = 4 \Rightarrow 4s$ ~~2f~~ $3d$ $4p$

$n = 5 \Rightarrow 5s$ ~~3f~~ $4d$ $5p$

$n = 6 \Rightarrow 6s$ $4f$ $5d$ $6p$

~~1p: $n = 1$, $l = 1$~~

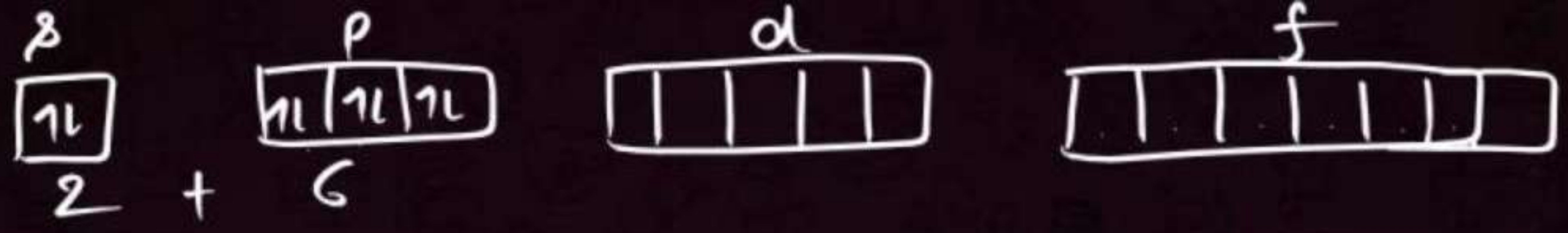
~~2f~~

$2p$

$n = 2$

$l = 1$

$n > l$



PERIOD NO.	SUBSHELLS FILLED	ELEMENTS	NO. OF ELEMENTS	PERIOD NAME
1	1s		2	SHORTEST
2	2s, 2p		8	SHORT
3	3s, 3p		8	SHORT
4	4s, 3d, 4p		18	LONG
5	5s, 4d, 5p		18	LONG
6	6s, 4f, 5d, 6p		32	LONGEST
7	7s, 5f, 6d, 7p		32	LONGEST*

$5e^-$

Q. If an orbital can accomodate $3e^-$ then find the no. of elements in 3rd period?

$n = 3 \Rightarrow 3s^3 \quad 3p^9$ $\qquad 3 + 9 = 12$

$4 \times 2 = 8$

$4 \times 3 = 12$

$4 \times 5 = \underline{\underline{20}}$

$ns \ldots (n-4)h \; (n-3)g \; (n-2)f \; (n-1)d \; np$

$n = 8$

$8s$ — 1

~~8i~~ ~~4h~~ 5g 6f 7d 8p

9 7 5 3

~~$n = 4$, $l = 5$~~

$n = 5$

$l = 4$

$25 \times 2 = 50$

	l
s	0
p	1
d	2
f	3
g	4
h	5
i	6
j	7
k	8

Q If an orbital can accomodate $3e^-$ then no of elements present in 8^{th} period?

$$25 \times 2 = 50$$
$$\times 3 = 75$$
$$25 \times 5 = 125$$

QUESTION

The electronic configuration of an element is $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^6$ $4d^{10}, 5s^2, 5p^3$ From which group of the periodic table it belongs?

(Karnataka CET 2010)

(A) 2^{nd}

(B) 5^{th}

(C) 3^{rd}

(D) 7^{th}

Question

Find the no. of elements present in 7^{th} period of the periodic table ?

A. 18

B. 32

C. 50

D. 72

Question

Find the no. of elements present in 3^{rd} period of the periodic table ?

A) 18

B) 32

C) 2

D) 8

Question

Find the no. of elements present in 8^{th} period of the periodic table ?

(A) 18

(B) 32

(C) 50

(D) 72

Question

Find the no. of elements present in 8^{th} period of the periodic table if an orbital can accommodate 3 e- ?

(A) 18

(B) 32

(C) 50

(D) 75

Question

H.W.

Find the no. of elements present in 9th period of the periodic table if an orbital can accommodate 3 e- ?

(A) 32

(B) 50

(C) 75

(D) 72

Problem 3.2

How would you justify the presence of 18 elements in the 5^{th} period of the Periodic Table?

NCERT

18

Problem 3.3

The elements $Z = 117$ and 120 have not yet been discovered. In which family / group would you place these elements and also give the electronic configuration in each case.

IUPAC Naming of Elements

106
Unh

Uuu
111

Uue
119
Uuo
118

Uns
107

104

Un + nil + quad + "ium"
⇓
Unnilquadium
(Unq)

Table 3.4 Notation for IUPAC Nomenclature of Elements

Digit	Name	Abbreviation
0	nil	n
1	un	u
2	bi	b
3	tri	t
4	quad	q
5	pent	p
6	hex	h
7	sept	s
8	oct	o
9	enn	e

Question

Unbinilium

What would be the IUPAC name of the element with atomic number 120 ?

[Kerala PMT-2015]

A. Unnilbium

B. Ununbium

C. Unnilunium

D. Unbinilium

Question

The IUPAC name of the element with atomic number 119 is : [NEET - 2022]

Ununennium

A Unnilbium

B Ununennium

C Unnilunium

D Unbinilium

Question

Ac → $_{90}$Th ⟶ Md 101 ⟶ Lr 103

Identify the incorrect match

[NEET - 2020]

NAME	IUPAC NAME
(a) Unnilunium ✓	(i) Mendelevium (101)
(b) Unniltrium ✓	(ii) Lawrencium (103)
(c) Unnilhexium ✓	(iii) Seaborgium (106)
(d) Unununium ✗	(iv) Darmstadtium (110)

A (b) – (ii)

B (c) – (iii)

C (d) – (iv) ✓

D (a) – (i)

Group & Period Identification

(1) When Atomic No. is given :

(if −ve → 32)

Group No. = 18 + given At. No. − At. No. of Next Noble gas

Period No. = Period No. of Next Noble gas.

$_{2}He \to 1$
$_{10}Ne \to 2$
$_{18}Ar \to 3$
$_{36}Kr \to 4$
$_{54}Xe \to 5$
$_{86}Rn \to 6$
$_{118}Og \to 7$

Ex : Z = 34 G = ? P = ?

G = 16 P = 4

G = 18 + 34 − 36
= 16

$118 \geq Z \geq 104$

P = 7th

G = last 2 digits of At. No.

Ex :→ 116 ⇒ G = 16
P = 7

106 ⇒ G = 6
P = 7

117 ⇒ G = 17
P = 7

Z = 119

G = 1
P = 8 ?

Z = 120
G = 2
P = 8

Case-2 :→ if e⁻ config is given.

Period no. = value of n

Ex: $_{54}[Xe]\,6s^2\,4f^{14}\,5d^{10}\,6p^2$ (82)

P = 6

G =

Screening Effect & Zeff

Zeff → A.A.P.O.N

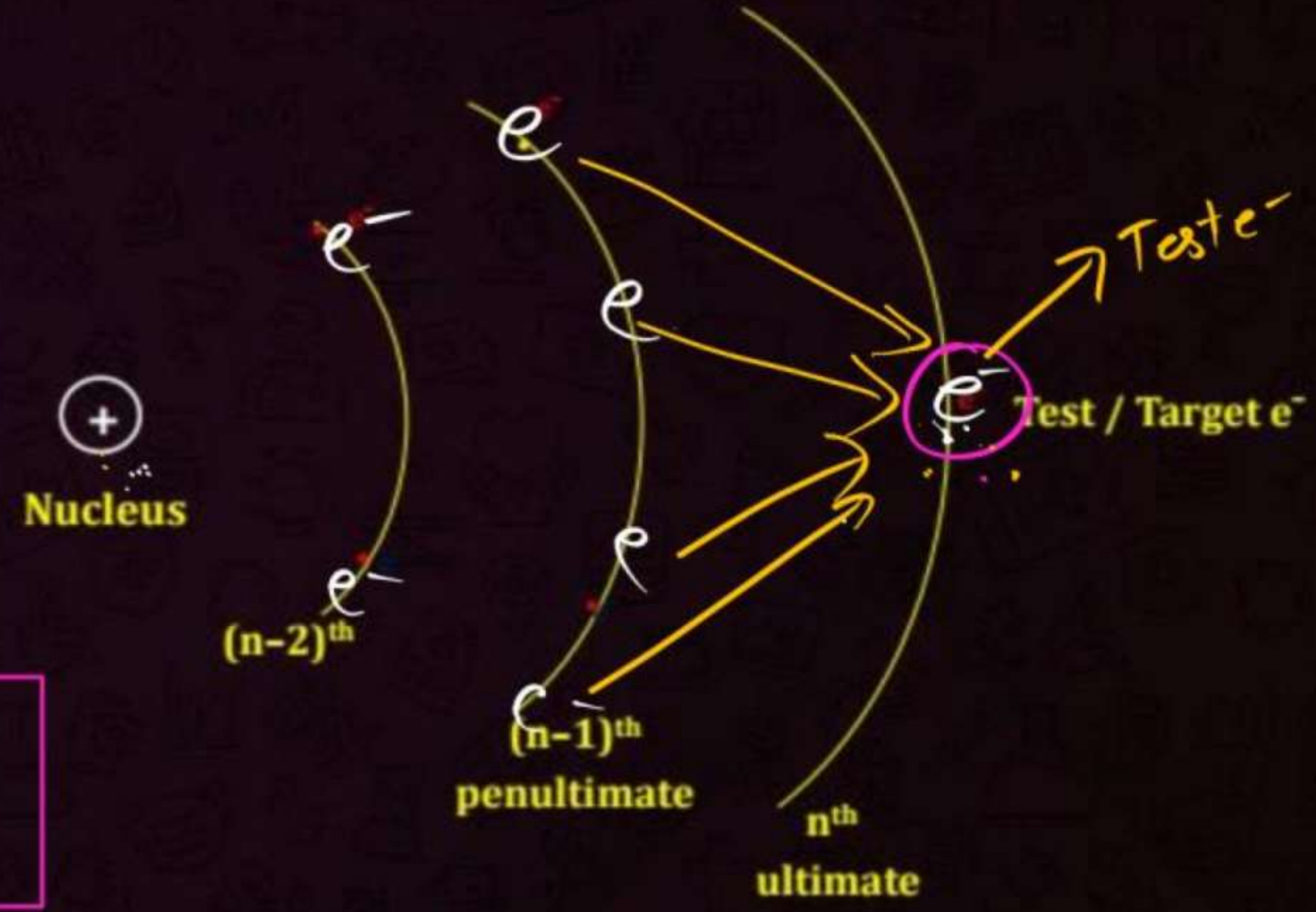
Nuclear charge = Z (no. of p^+)

Actual Attrⁿ = Attrⁿ − Rep.

$$Z_{eff} = Z - \sigma$$

σ = screening | shielding const.

order of screening = $s > p > d > f$



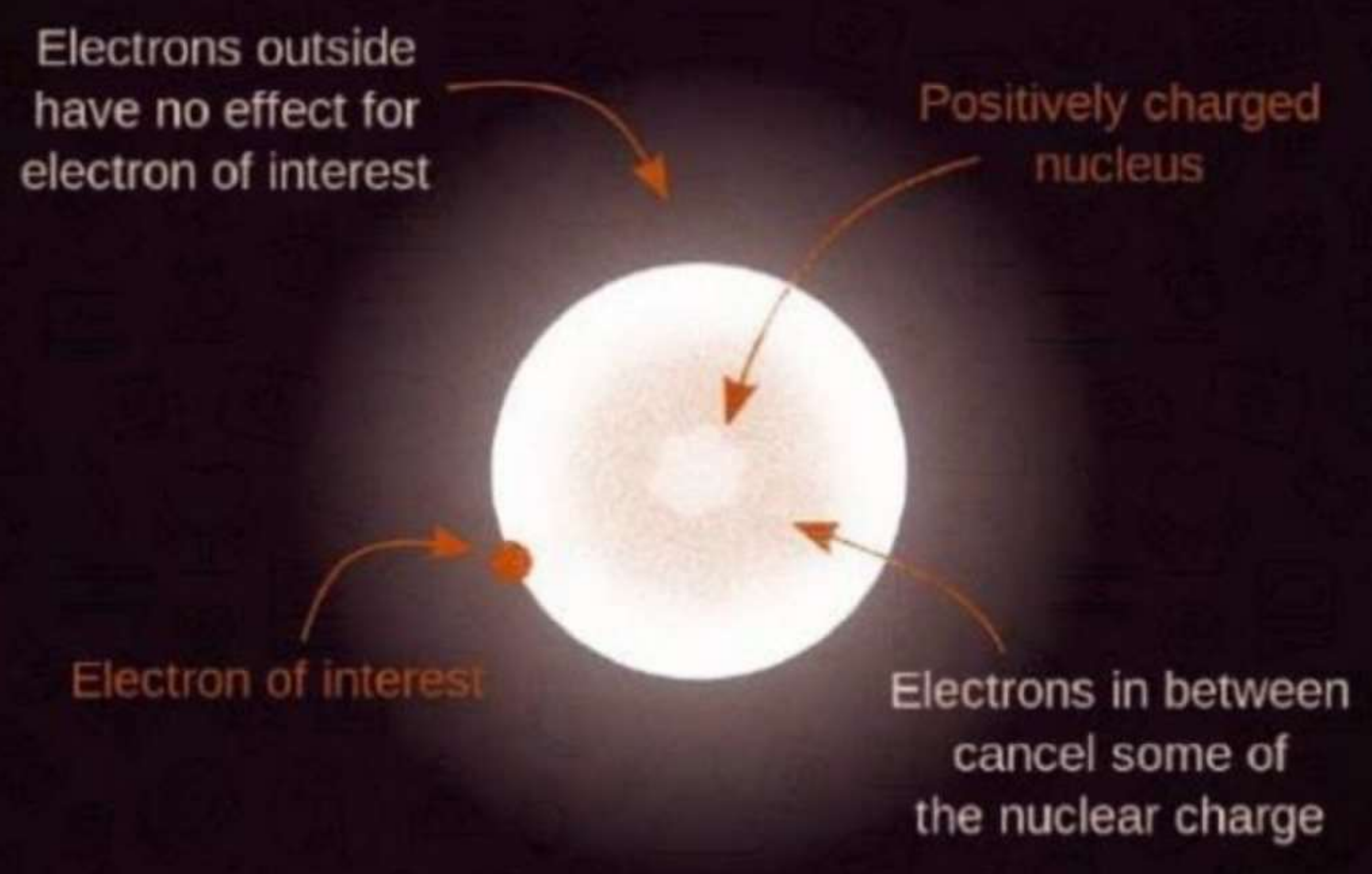
* Z_{eff} → in a period Z_{eff} ↑ from L to R

* Isoelectronic Species :→

Ex: F^{-} O^{-2} N^{-3} −ve ↑ Z_{eff} ↓

Na^{+} Mg^{+2} Al^{+3} +ve ↑ Z_{eff} ↑

$$Z_{eff} \propto \frac{+ve}{-ve}$$


Electrons outside have no effect for electron of interest
Positively charged nucleus
Electron of interest
Electrons in between cancel some of the nuclear charge

Question

Determine the correct order of Z_{eff}?

A. $Co < Co^{2+} < Co^{+3}$ ✓

B. $Ca^{2+} < K^{+} < Sc^{3+}$ ✗

C. $I^{+} < I < I^{-}$ ✗

D. $O^{-} > O > O^{2-}$ ✗

Question

Screening effect is not observed in

$\sigma = 0$

(A) He^{+}

(B) Li^{+2}

(C) H

(D) All of these ✓

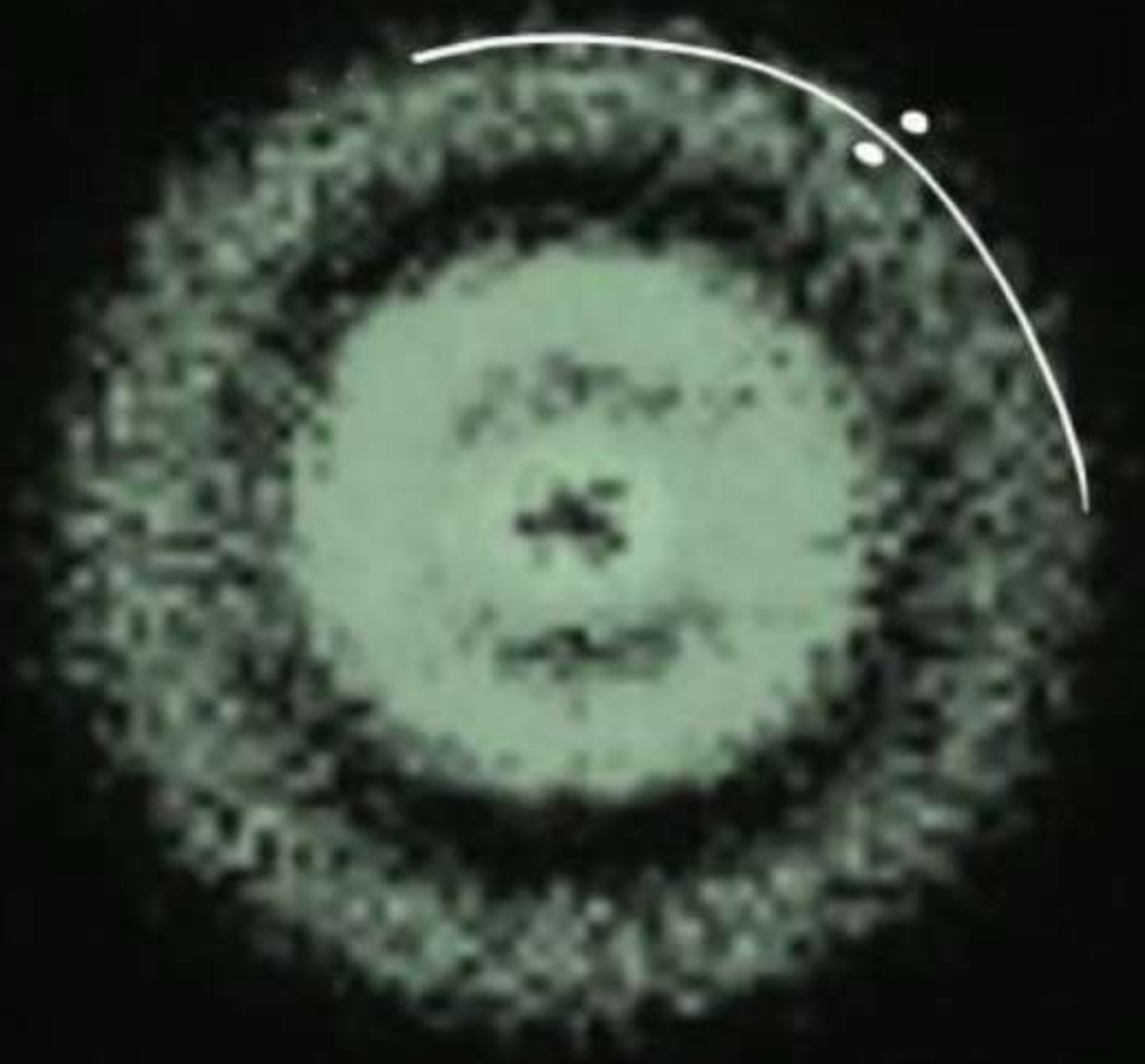
ATOMIC RADIUS

It is the distance b/w centre of the nucleus and the outermost e^- in an isolated gaseous atom
(अकेला / single)

Difficulties :

1. size of atom is very small
2. boundary of an atom is not defined
3. Isolation of an atom is very difficult.

YOU CAN CALL ME



"ATOM"

Types Of Atomic Radii

(i) Covalent Radius :

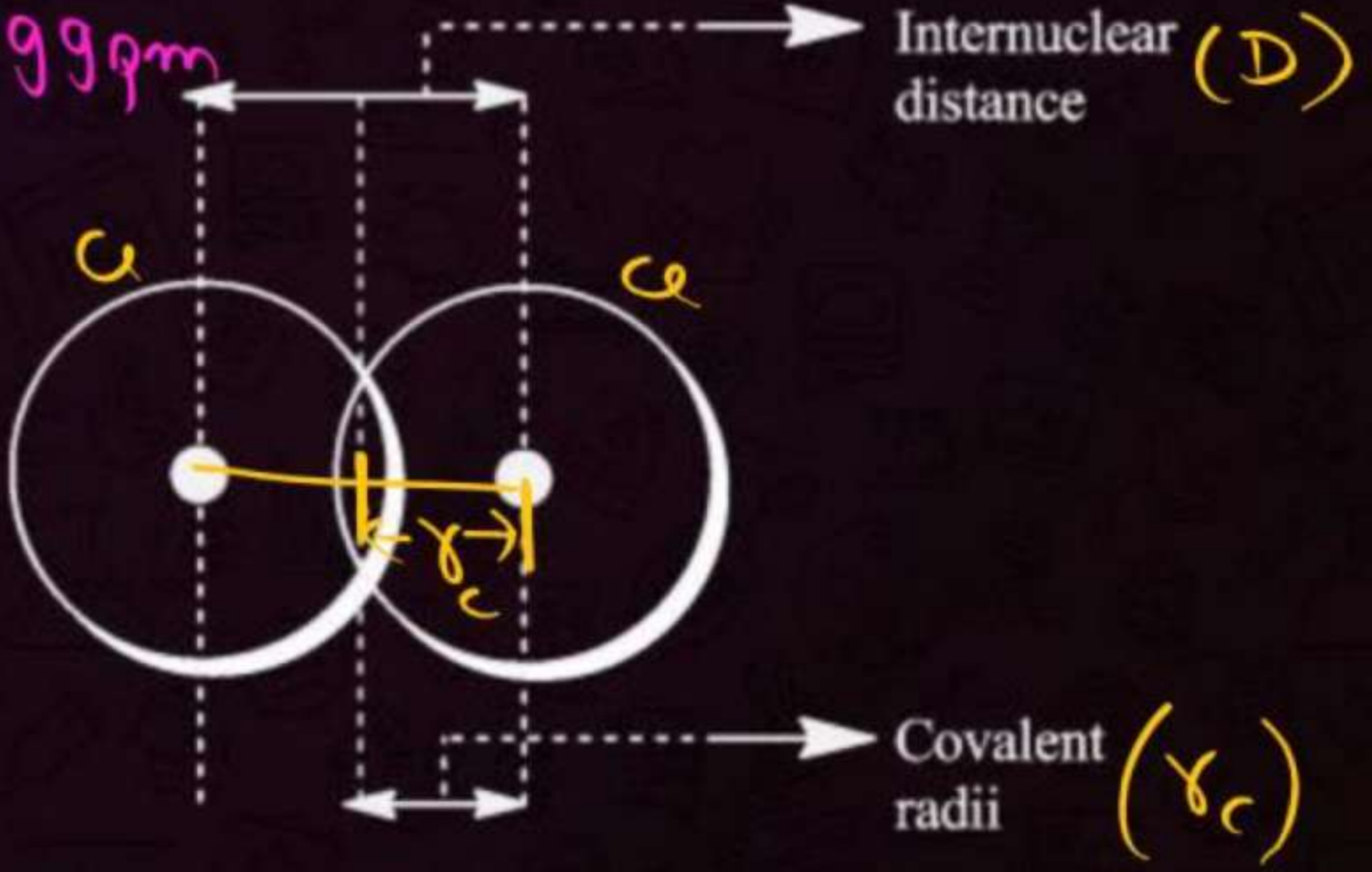
Cl_2

$D_{Cl-Cl} = 198\ pm$

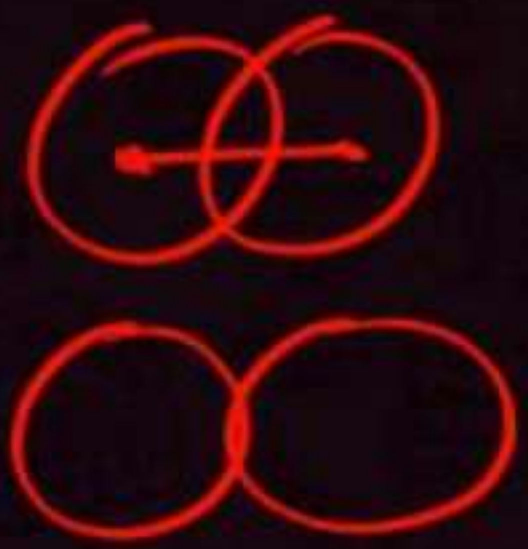
$r_c = \frac{198}{2} = 99\ pm$

D → Internuclear distance / B.L.

$$r_c = \frac{D}{2} = \frac{B.L.}{2}$$

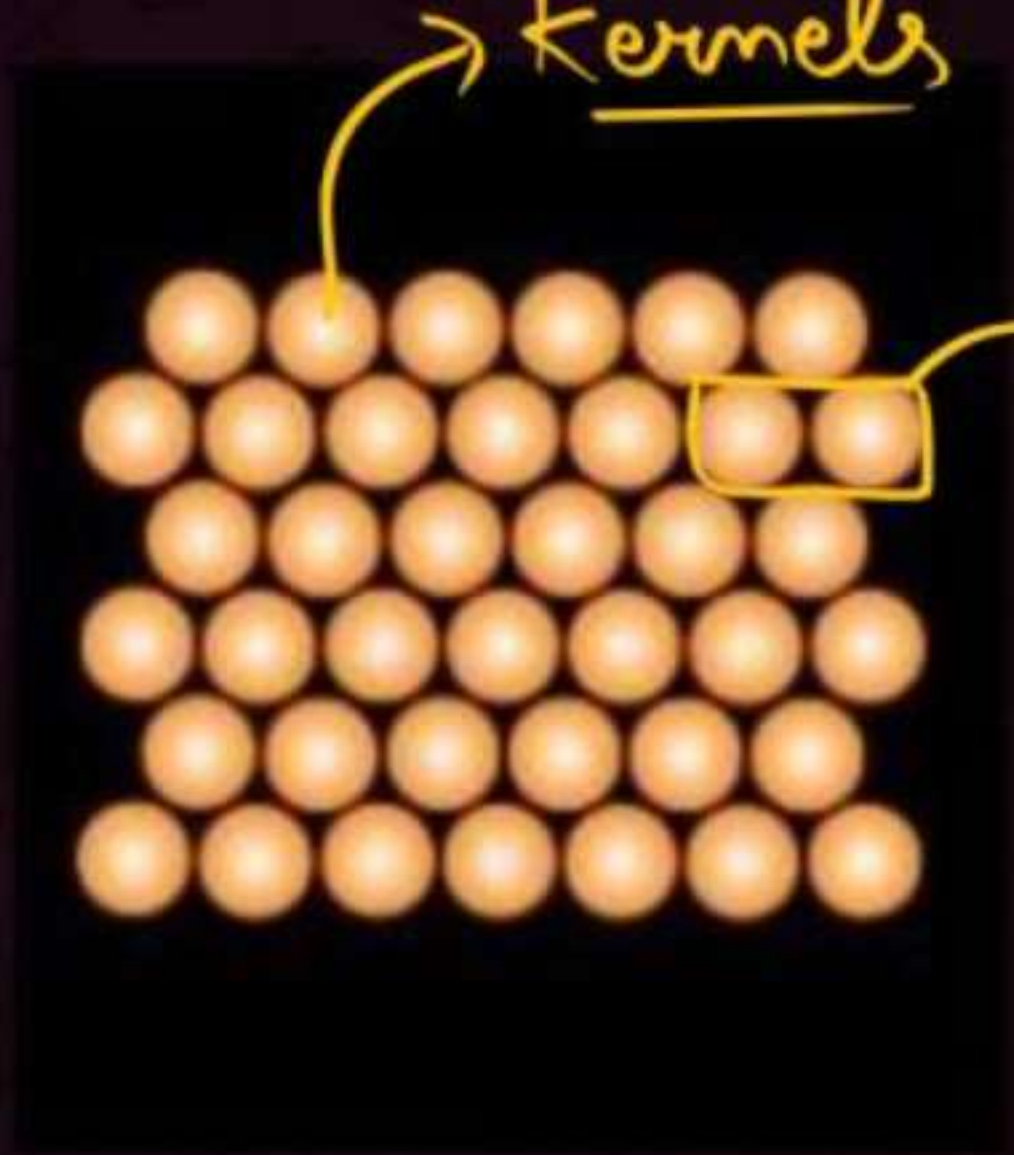


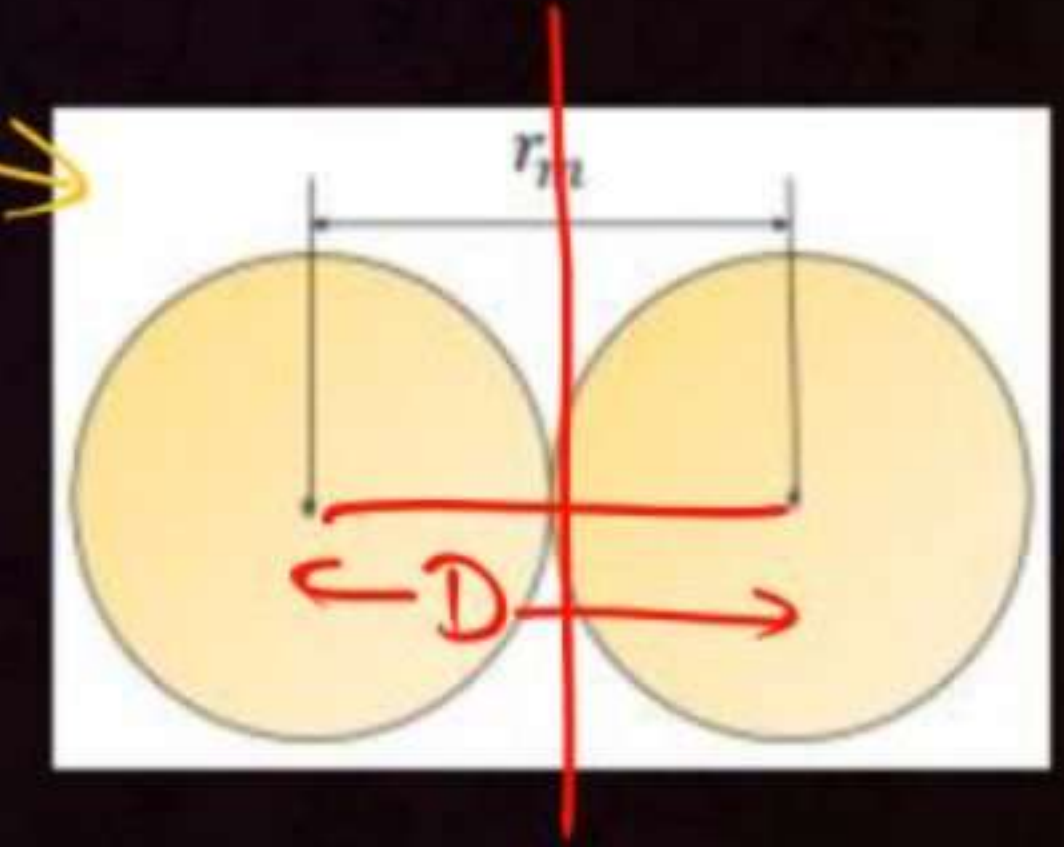
(ii) Metallic Radius : (Crystal Radius)



$$r_m = \frac{D}{2}$$

$$r_m \propto \frac{1}{\text{Met. Bond Strength}}$$

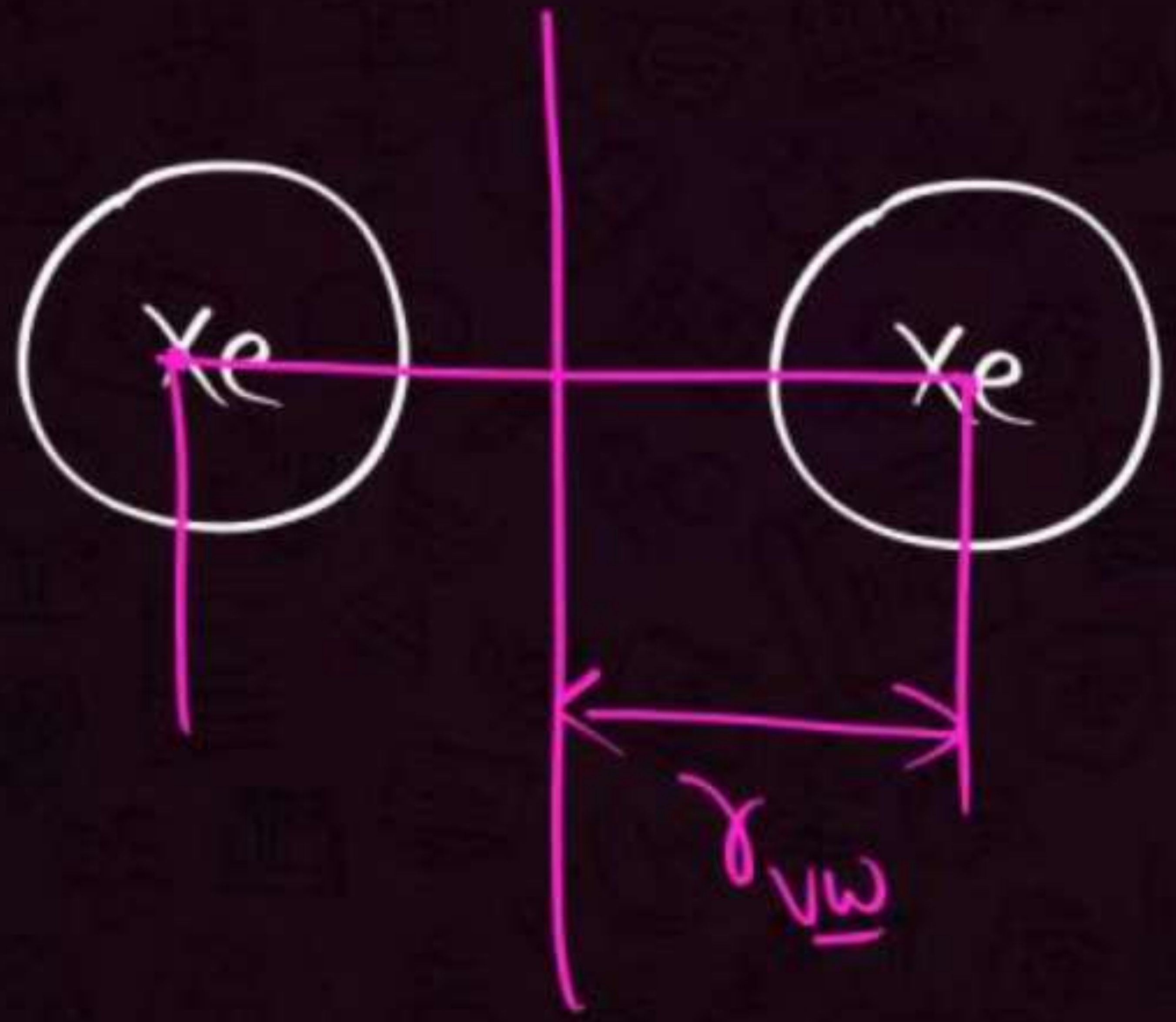


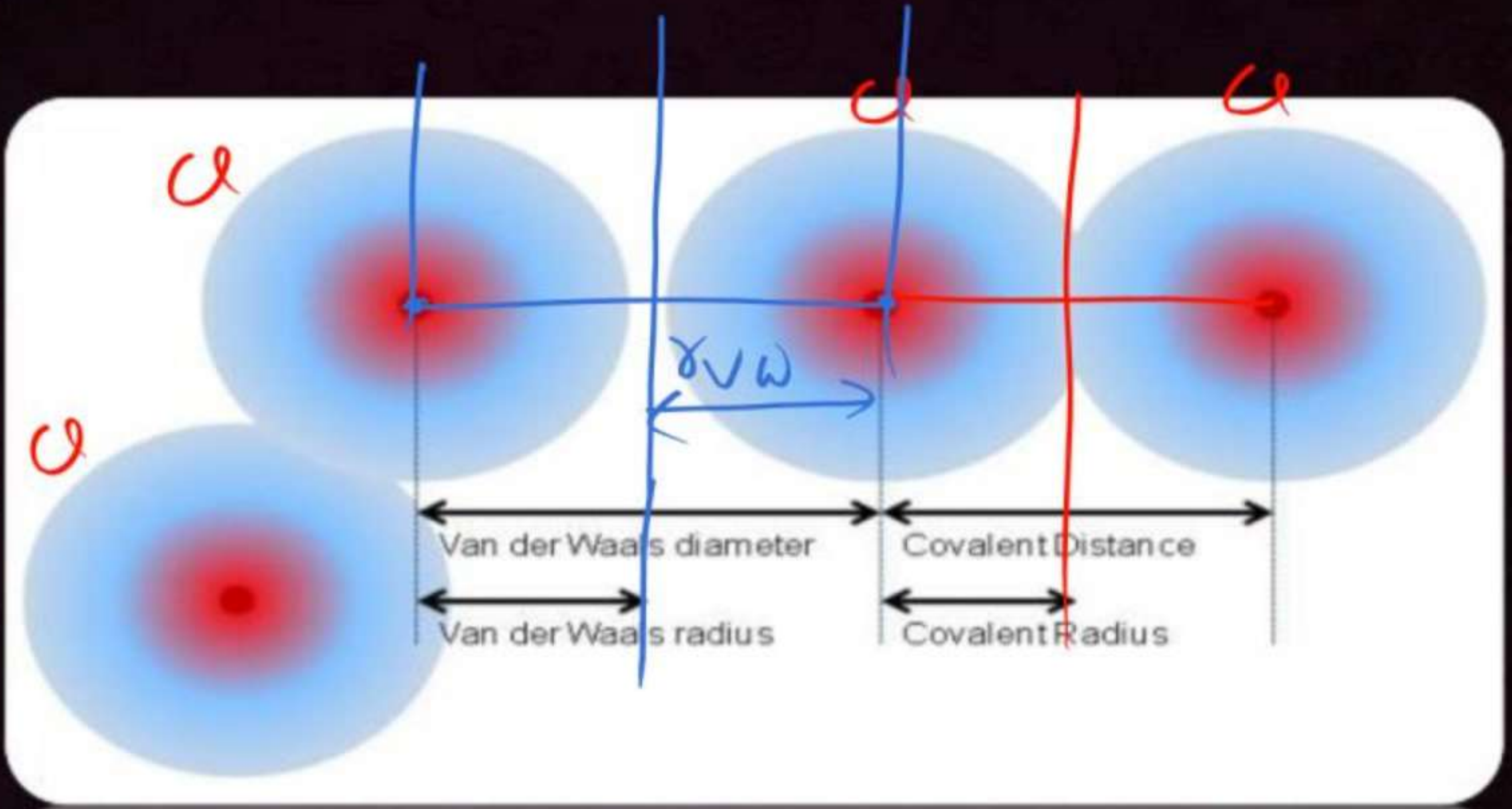


Cr < Mn

→ Weak Met. Bond

(iii) Vander Waal Radius : (Noble gas Radius)




Van der Waals diameter
Covalent Distance
Van der Waals radius
Covalent Radius

$$r_c < r_m < r_{vw}$$

IONIC RADII

Cationic Radius

$$A \longrightarrow A^{+} \longrightarrow A^{+2} \longrightarrow A^{+3}$$

A	A^{+}	A^{+2}	A^{+3}
$10e^- \Rightarrow$	$9e^-$	$8e^-$	$7e^-$
$10p^+ \Rightarrow$	$10p^+$	$10p^+$	$10p^+$

$$\text{size} \propto \frac{1}{+ve}$$

Anionic Radius

$$B + e^- \longrightarrow B^- \xrightarrow{+e^-} B^{-2} \xrightarrow{+e^-} B^{-3}$$

$$\text{size} \propto -ve$$

$$\downarrow \text{size} \propto \frac{-ve}{+ve \uparrow}$$

Ex: $Fe > Fe^{+2} > Fe^{+3}$

$Mn^{+2} > Mn^{+4} > Mn^{+7}$

$Cr^{+2} > Cr^{+3} > Cr^{+4} > Cr^{+5} > Cr^{+6}$

$N < N^{-} < N^{-2} < N^{-3}$

$O^{-} < O^{-2}$

$I^{+} < I < I^{-}$

Cation < Neutral < Anion

$Na^{+} > Mg^{+2} > Al^{+3}$

$N^{-3} > O^{-2} > F^{-}$

Variation Of Size in Group & Period

Period ⇒ L $\xrightarrow[\text{size}\downarrow]{Z_{eff}\uparrow}$ R

$$\text{size} \propto \frac{1}{Z_{eff}}$$

Li > Be > B > C > N > O > F < Ne

Ne → V.W.R.

Group :→ Top ↓ Bottom

no. of shells ↑

size ↑

Li < Na < K < Rb < Cs

Be < Mg < Ca < Sr < Ba

Table 3.6(a) Atomic Radii/pm Across the Periods

Atom (Period II)	Li	Be	B	C	N	O	F
Atomic radius	152	111	88	77	74	66	64
Atom (Period III)	Na	Mg	Al	Si	P	S	Cl
Atomic radius	186	160	143	117	110	104	99

Table 3.6(b) Atomic Radii/pm Down a Family

Atom (Group I)	Atomic Radius	Atom (Group 17)	Atomic Radius
Li	152	F	64
Na	186	Cl	99
K	231	Br	114
Rb	244	I	133
Cs	262	At	140

QUESTION

$O^{-2} > F^- > Na^+ > Al^{+3}$

Increasing order or ionic size for the ions, F^-, O^{2-}, Na^+, Al^{3+} is: (AMU 2009)

(A) $O^{2-} < F^- < Na^+ < Al^{3+}$

(B) $Al^{3+} < Na^+ < F^- < O^{2-}$

(C) $O^{2-} < Na < F^- < Al^{3+}$

(D) $Al^{3+} > F^- < Na^+ < O^{2-}$

Ans. (D)

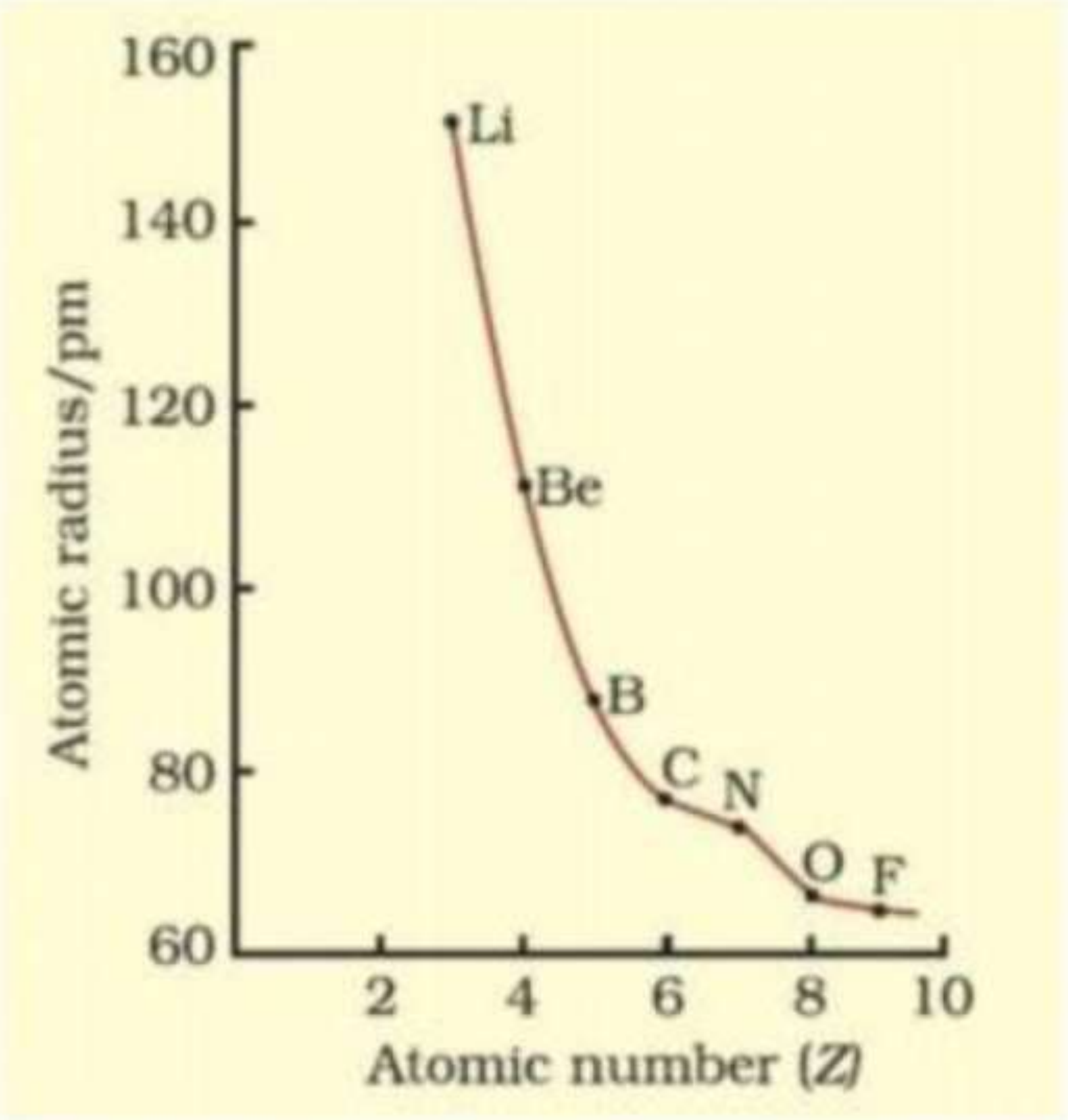


Fig. 3.4 (a) *Variation of atomic radius with atomic number across the second period*

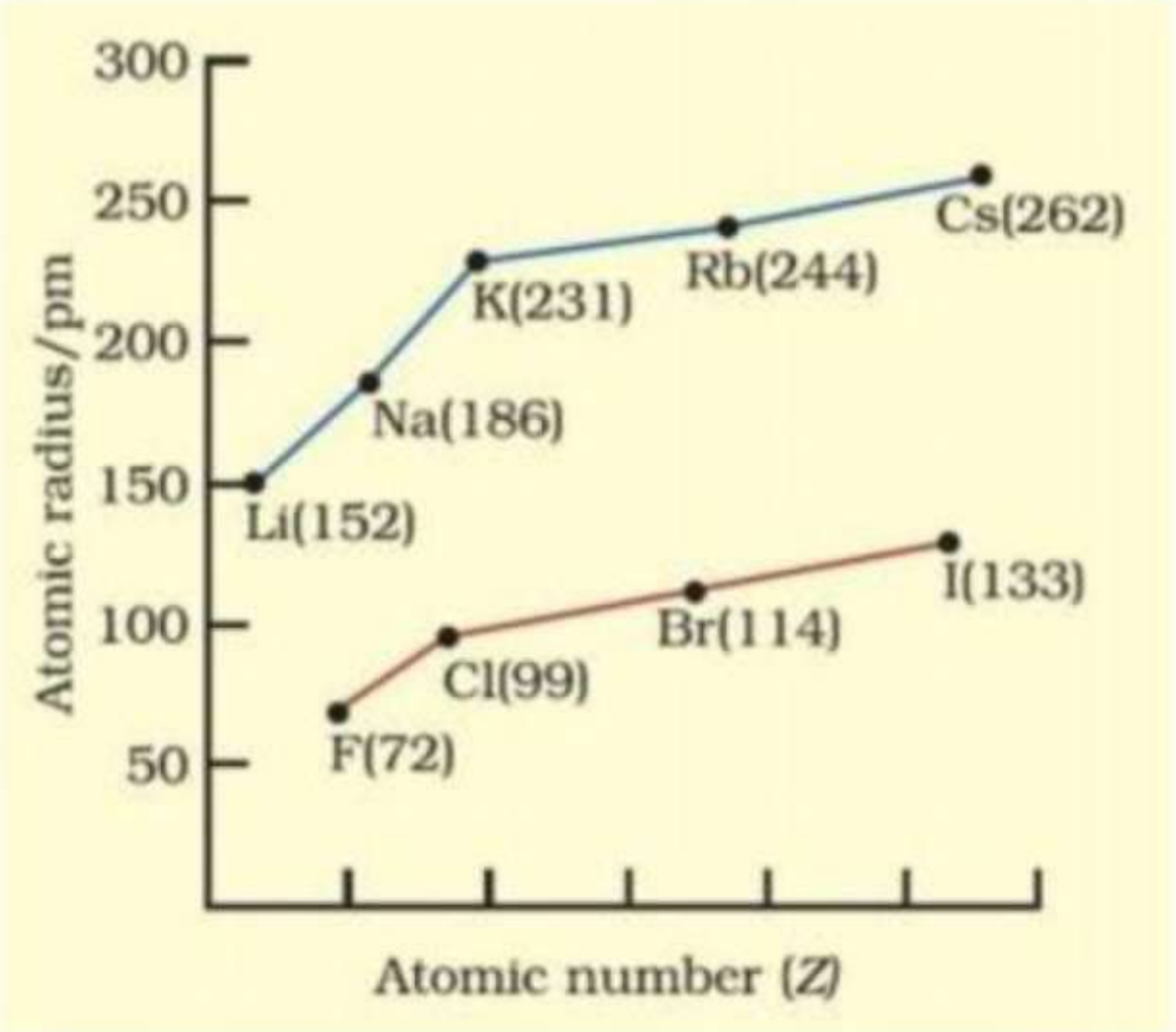


Fig. 3.4 (b) *Variation of atomic radius with atomic number for alkali metals and halogens*

NCERT CORNER

In general, the ionic radii of elements exhibit the same trend as the atomic radii. A cation is smaller than its parent atom because it has fewer electrons while its nuclear charge remains the same. The size of an anion will be larger than that of the parent atom because the addition of one or more electrons would result in increased repulsion among the electrons and a decrease in effective nuclear charge. For example, the ionic radius of fluoride ion (F^-) is 136 pm whereas the atomic radius of fluorine is only 64 pm. On the other hand, the atomic radius of sodium is 186 pm compared to the ionic radius of 95 pm for Na^+.

NEET 2025

Problem 3.5

Which of the following species will have the largest and the smallest size?
Mg, Mg^{2+}, Al, Al^{3+}.

Solution

Atomic radii decrease across a period. Cations are smaller than their parent atoms. Among isoelectronic species, the one with the larger positive nuclear charge will have a smaller radius.

Hence the largest species is Mg; the smallest one is Al^{3+}.

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Mg Mg^{+2}

Al Al^{+3}

Cations < Neutral

$Al^{+3} < Mg^{+2} < Al < Mg$

Question

Which of the following sequences is correct for decreasing order of ionic radius -

(A) $Se^{-2} > I^{-} > Br^{-} > O^{-2} > F^{-}$

(B) $I^{-} > Se^{-2} > O^{-2} > Br^{-} > F^{-}$

(C) $Se^{-2} > I^{-} > Br^{-} > F^{-} > O^{-2}$

(D) $I^{-} > Se^{-2} > Br^{-} > O^{-2} > F^{-}$

$n=5$ $n=4$ $n=2$

I^{-} (54) $Se^{-2} > Br^{-}$ ($36e^{-}$) $O^{-2} > F^{-}$ ($10e^{-}$)

$I^{-} > Se^{-2} > Br^{-} > O^{-2} > F^{-}$

Order of size in P-block :

B < Al < Ga < In < Tl

Al > Ga

S.C/T.C.

3d e⁻ ⇒ poor σ ⇒ Z_{eff} ↑

B < Ga < Al < In < Tl

C < Si < Ge < Sn < Pb

N < P < As < Sb < Bi

O < S < Se < Te < Po

F < Cl < Br < I < At

He < Ne < Ar < Kr < Xe < Rn < Og

Order of size in D-block :

3d series

d^1 d^2 d^3 d^5 d^6 d^{10}

$Sc > Ti > V > Cr > Mn > Fe \approx Co \approx Ni < Cu < Zn$

Z_{eff} dominating (Sc to Fe) | $Z_{eff} \approx \sigma$ (Fe, Co, Ni) | σ dominating (Cu, Zn)

$Sc < Y < La$

$Ti < Zr \approx Hf$ → L.C. $4f^{14}$ ⇒ very Poor σ ⇒ $Z_{eff}\uparrow$ ⇒ size ↓

$$3d < 4d \approx 5d$$

Ionic Radius (f-block) : $Z_{eff} \uparrow$ size $\downarrow$

$La^{+3} > Ce^{+3} > Pr^{+3} > Nd^{+3} > Pm^{+3} > Sm^{+3} > Eu^{+3} > Gd^{+3} > Tb^{+3} > Dy^{+3} > Ho^{+3} > Er^{+3} > Tm^{+3} > Yb^{+3} >$
Lu^{+3}

$4f\ e^- \uparrow$

$\sigma \downarrow$

$Z_{eff} \uparrow$

contraction $\uparrow$

Question

Incorrect order of ionic size is:

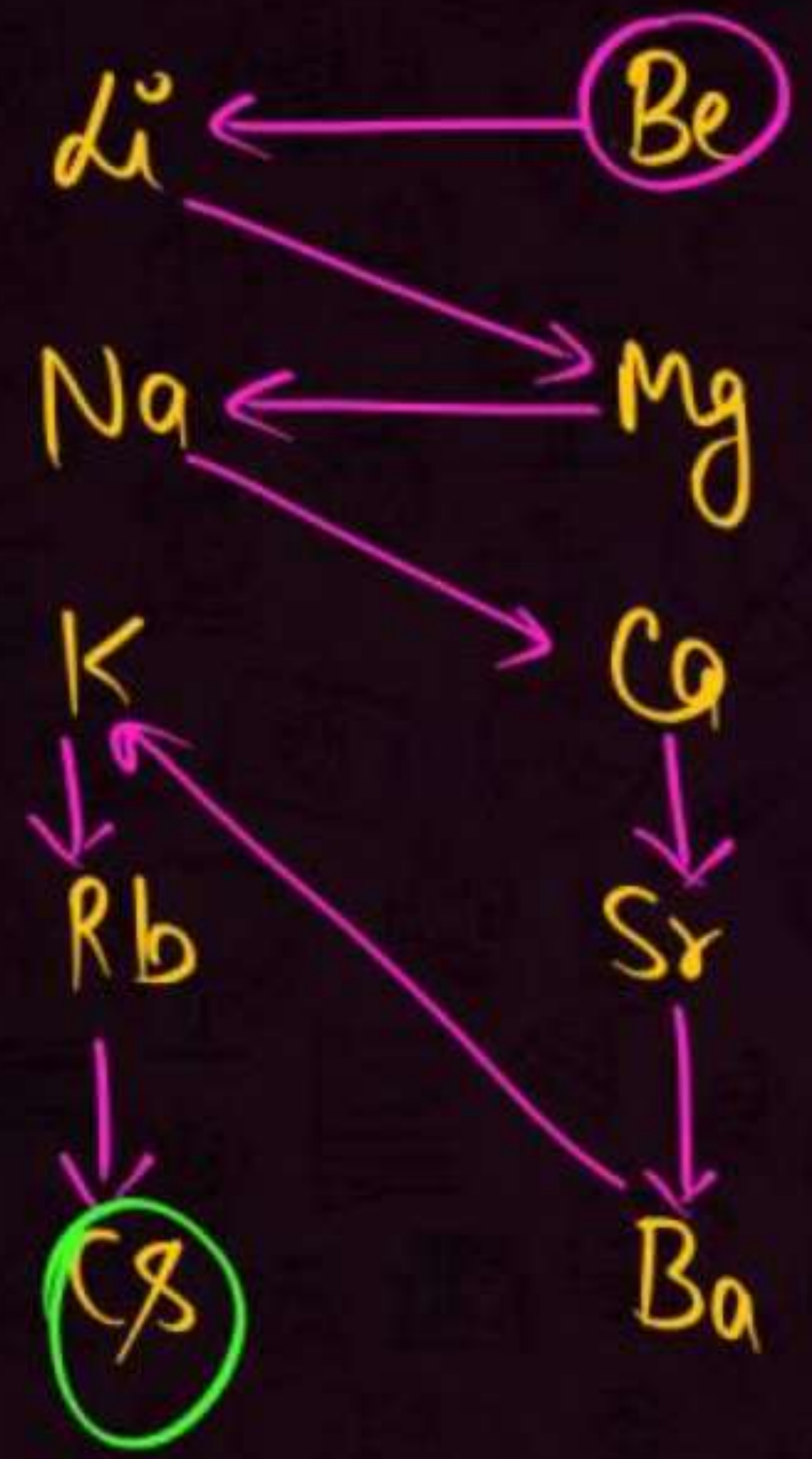
A) $La^{+3} < Gd^{+3} < Eu^{+3} < Lu^{+3}$

B) $V^{+2} < V^{+3} < V^{+4} < V^{+5}$

C) $K^{+} < Sc^{+3} < V^{+5} < Mn^{+7}$

D) All are incorrect

Order of size in s-block :



AIIMS

$Li^{+} > Mg^{+2}$

$Be^{+2} < Al^{+3}$

$Li^{+} \searrow Mg^{+2}$

ϕ = similar

$\left(\frac{\text{Charge}}{\text{size}}\right)$

Ionic Pot.

IONIZATION ENERGY

The amount of energy required to remove an e^- from an isolated gaseous atom is c|d Ionization Energy.

$$Na_{(g)} \xrightarrow{I.E.\downarrow} Na^{+}_{(g)} + e^-$$

$$Na_{(s)} \xrightarrow{E\downarrow} Na^{+}_{(g)} + e^-$$

$$Na_{(s)} \xrightarrow{S.E.} Na_{(g)} \xrightarrow{I.E.\downarrow} Na^{+}_{(g)}$$

$$E = S.E + I.E.$$

Question

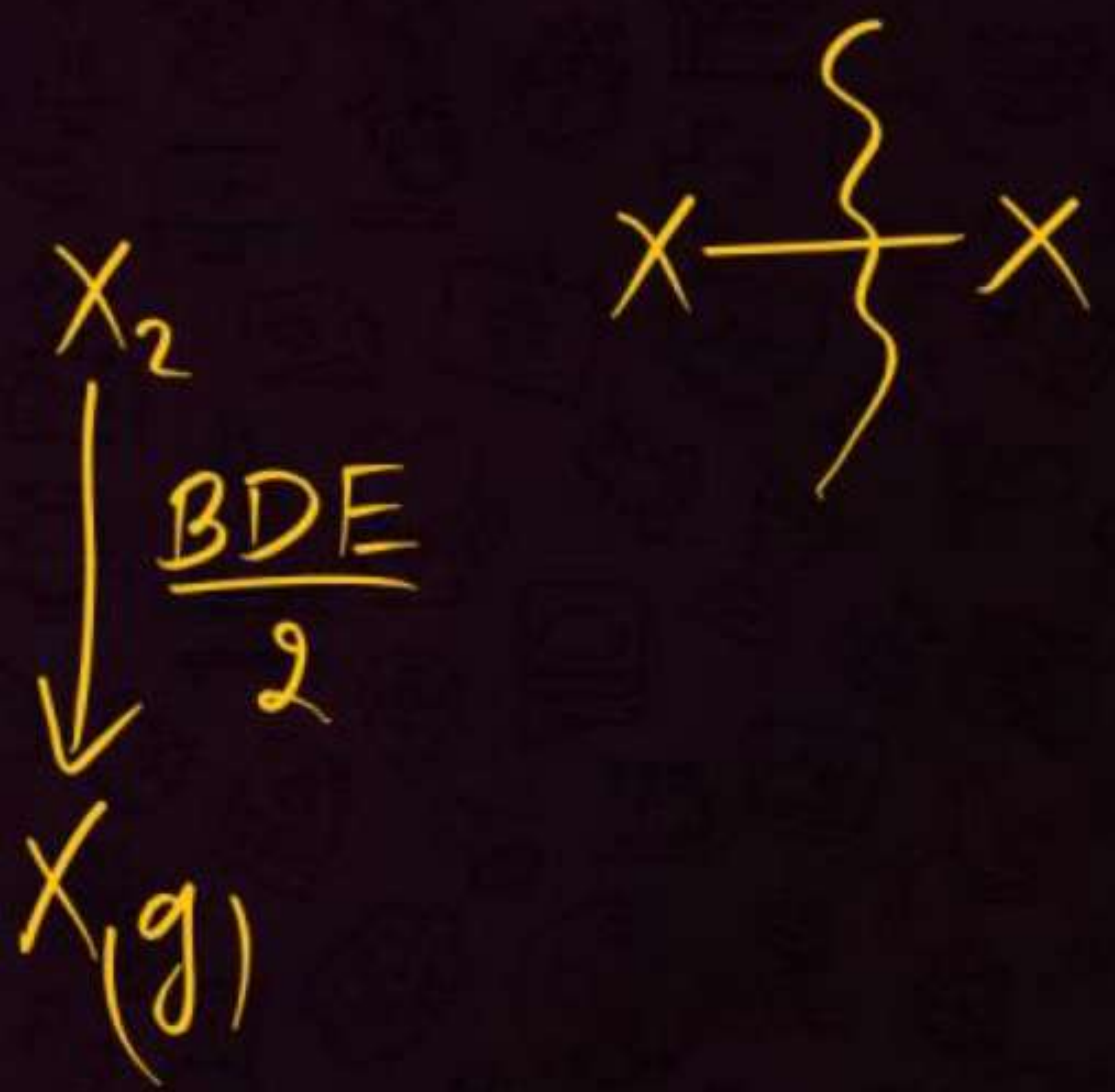
In which of the following process the energy change corresponds to Ionisation Energy ?

A $X_{(s)} \longrightarrow X^+_{(g)} + e^-$

B $X_{2(g)} \longrightarrow X^+_{(g)} + e^-$

C $X_{(g)} \longrightarrow X^+_{(g)} + e^-$

D $X_{(aq)} \longrightarrow X^+_{(aq)} + e^-$



SUCCESSIVE IONIZATION ENERGY

$$M \xrightarrow{IE_1} M^{+} \xrightarrow{IE_2} M^{+2} \xrightarrow{IE_3} M^{+3}$$

$$IE_1 < IE_2 < IE_3 < IE_4 \ldots IE_{(n-1)} < IE_n$$

IE_2 of M = IE_1 of M^+

IE_3 of M = IE_1 of M^{+2} = IE_2 of M^+

× **Note** :→ Successive I.E. are always higher.

NCERT CORNER

Energy is always required to remove electrons from an atom and hence ionization enthalpies are always positive. The second ionization enthalpy will be higher than the first ionization enthalpy because it is more difficult to remove an electron from a positively charged ion than from a neutral atom. In the same way the third ionization enthalpy will be higher than the second and so on. The term "ionization enthalpy", if not qualified, is taken as the first ionization enthalpy.

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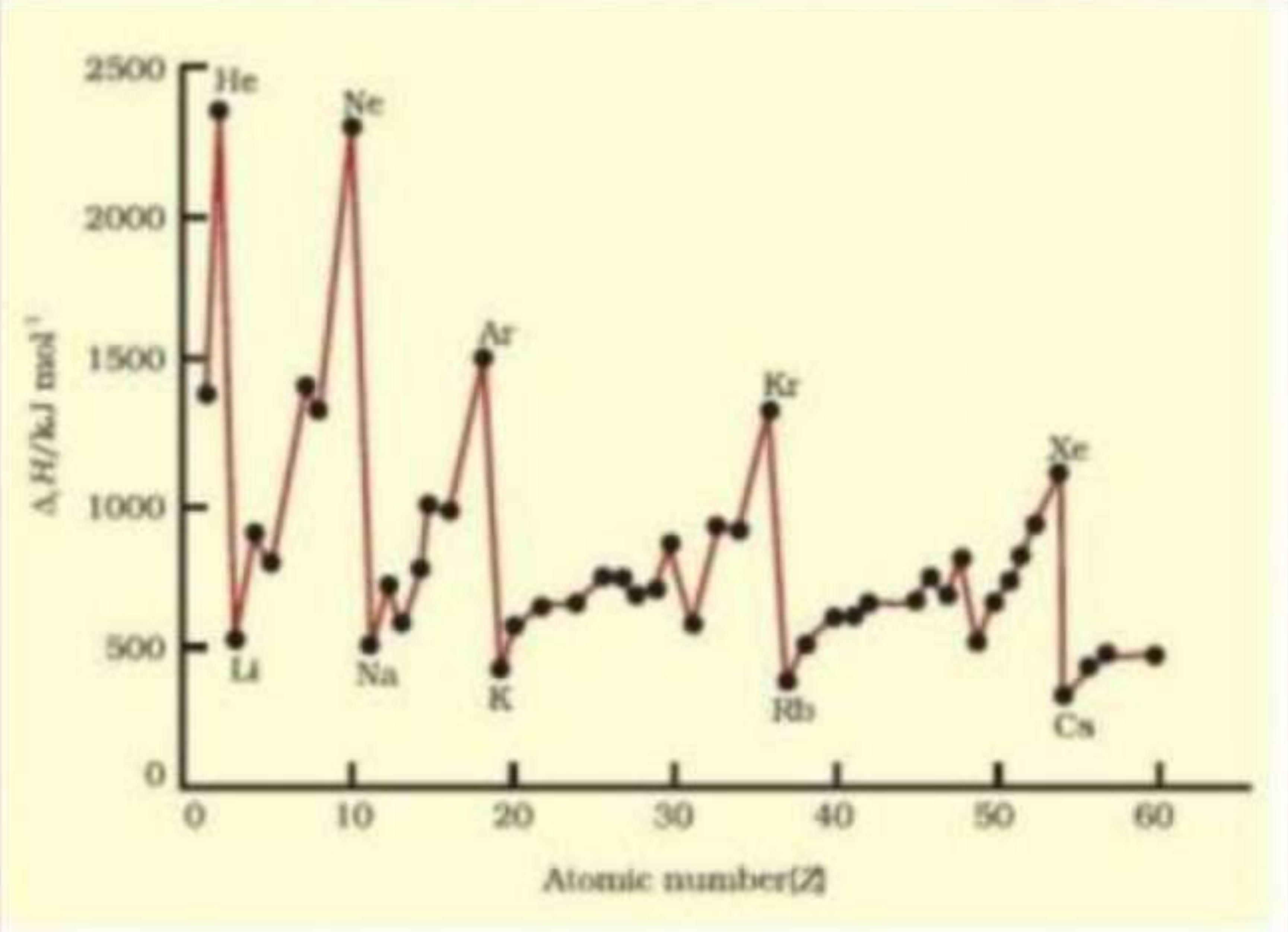


Fig. 3.5 Variation of first ionization enthalpies ($\Delta_i H$) with atomic number for elements with Z = 1 to 60

FACTORS AFFECTING I.E.

① Zeff :→

$$I.E \propto Z_{eff}$$

Ex: B < C < N

Al < Si < P

② Size :→

$$I.E \propto \frac{1}{size}$$

Ex: Li > Na > K > Rb > Cs

Be > Mg > Ca > Sr > Ba

(3) Panetration Power of Subshells :-

⇓

closeness from the nucleus → $s > p > d > f$

Be	>	B
$2s^2$		$2p^1$
ns^2		

ns^2		np^1
Be	>	B
Mg	>	Al

(4) Stable Config :→

$IE_1 \Rightarrow \overset{2p^3}{N} > \overset{2p^4}{O}$

$I.E_2 \Rightarrow \overset{2p^2}{N} < \overset{2p^3}{O}$

$IE_2 \Rightarrow \overset{2p^3}{O} > \overset{2p^4}{F}$

NCERT CORNER

You will appreciate that the ionization enthalpy and atomic radius are closely related properties. To understand these trends, we have to consider two factors : (i) the attraction of electrons towards the nucleus, and (ii) the repulsion of electrons from each other. The effective nuclear charge experienced by a valence electron in an atom will be less than the actual charge on the nucleus because of **"shielding"** or **"screening"** of the valence electron from the nucleus by the intervening core electrons. For example, the 2*s* electron in lithium is shielded from the nucleus by the inner core of 1*s* electrons. As a result, the valence electron experiences a net positive charge which is less than the actual charge of +3. In general, shielding is effective when the orbitals in the inner shells are completely filled. This situation occurs in the case of alkali metals which have single outermost *ns*-electron preceded by a noble gas electronic configuration.

NEET 2025 *

2nd period

$Li < Be > B < C < N > O < F < Ne$

$Li < B < Be < C < O < N < F < Ne$

Max. I.E.

He

Min. I.E.

Cs

3rd period

⇒ $Na < Al < Mg < Si < S < P < Cl < Ar$.

* NEET 2025 *

Problem 3.6

The first ionization enthalpy ($\Delta_i H$) values of the third period elements, Na, Mg and Si are respectively 496, 737 and 786 kJ mol^{-1}. Predict whether the first $\Delta_i H$ value for Al will be more close to 575 or 760 kJ mol^{-1}? Justify your answer.

575 760

Na < Mg > Al < Si

496 737 786

Na < Al < Mg < Si

496 575 737 786

QUESTION

Among the following, third ionisation energy is highest for: (AMU 2010)

(A) magnesium

(B) boron

(C) beryllium

(D) aluminium

Be B

$2s^2$ $2p^1$

$1s^2$ [He] > $2s^1$

NCERT CORNER

From Fig. 3.6(a), you will also notice that the first ionization enthalpy of boron ($Z = 5$) is slightly less than that of beryllium ($Z = 4$) even though the former has a greater nuclear charge. When we consider the same principal quantum level, an *s*-electron is attracted to the nucleus more than a *p*-electron. In beryllium, the electron removed during the ionization is an *s*-electron whereas the electron removed during ionization of boron is a *p*-electron. The penetration of a 2*s*-electron to the nucleus is more than that of a 2*p*-electron; hence the 2*p* electron of boron is more shielded from the nucleus by the inner core of electrons than the 2*s* electrons of beryllium. Therefore, it is easier to remove the 2*p*-electron from boron compared to the removal of a 2*s*- electron from beryllium. Thus, boron has a smaller first ionization enthalpy than beryllium. Another "anomaly" is the smaller first ionization enthalpy of oxygen compared to nitrogen. This arises because in the nitrogen atom, three 2*p*-electrons reside in different atomic orbitals (Hund's rule) whereas in the oxygen atom, two of the four 2*p*-electrons must occupy the same 2*p*-orbital resulting in an increased electron-electron repulsion. Consequently, it is easier to remove the fourth 2*p*-electron from oxygen than it is, to remove one of the three 2*p*-electrons from nitrogen.

* **P-block :**

① B > Al < Ga > In < Tl

(Ga: S.C.; Tl: L.C.)

I.E. ⇒ B > Tl > Ga > Al > In

② C > Si > Ge > Sn < Pb

(Pb: L.C)

I.E. ⇒ C > Si > Ge > Pb > Sn

$N > P > As > Sb > Bi$

$O > S > Se > Te > Po$

$F > Cl > Br > I > At$

* **d-block** :→

(Zeff ↑)
L.C.

$3d > 4d < 5d$

$5d > 3d > 4d$

Ex: $Cu > Ag < Au$

APPLICATIONS OF I.E.

(1) Metallic/Non-Metallic Character :

$$\text{Metallic Nature} \propto \frac{1}{\text{I.E.}}$$

Ex: $Li < Na < K < Rb < Cs$ ⟶

size ↑ I.E ↓ Metallic Nature ↑

(2) Comparison in stability of oxidation states :

L.O.S. H.O.S.

$$M \xrightarrow{IE_1} \underline{M^+} \xrightarrow{IE_2} \underline{M^{+2}}$$

$\Delta IE = (IE_2 - IE_1)$ < 11 e.V. ⇒ H.O.S. More stable

> 16 e.V. ⇒ L.O.S. More stable

$IE_1 = 15$ e.V. $IE_2 = 22$ e.V. (45)

Ex: $Mg \longrightarrow Mg^{+1} \longrightarrow Mg^{+2}$

$\Delta IE = 22 - 15 = 7$ e.V.

③ *Imp* **No. of valence e^- :**

$A \rightarrow$ 15 e.V., 22 e.V., 45 e.V., (165 e.V), 195 e.V. ...

sudden large jump b/w I.E values

Valence e^- = $3e^-$

Most stable O.S. = +3

oxide = A_2O_3

Nitride = AN

Halide = AX_3

Hydride = AH_3

Q. Element A ?

① Mg ② Al ✓

③ Si ④ N

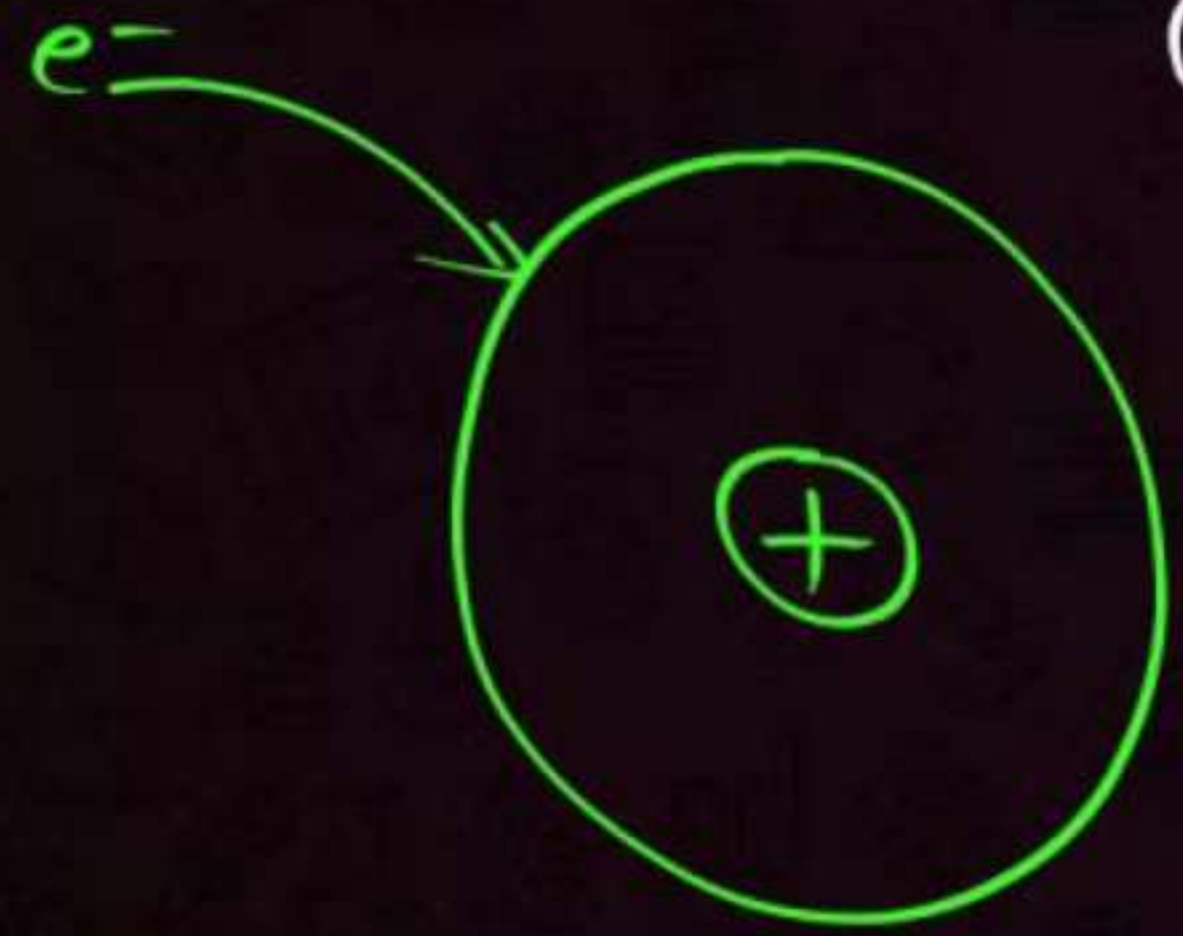
$$M^{+} \xrightarrow[\text{IE}_1 \text{ of } M^{+}]{\text{IE}_2} M^{+2} \xrightarrow[\text{IE}_1 \text{ of } M^{+2}]{\text{IE}_3} M^{+3}$$

IE_2 of M^{+}

ELECTRON AFFINITY

चाहत

The amt. of energy released when an e^- is added in an isolated gaseous atom.



$$Cl_{(g)} + e^- \longrightarrow Cl^-_{(g)} \qquad E \uparrow$$

$$He + e^- \longrightarrow He^- \qquad E \downarrow$$

$$E.A = 0$$

e^- gain enthalpy (ΔH_{eg})

$$Cl + e^- \longrightarrow Cl^- \Rightarrow \Delta H_{eg} = -ve$$

More the energy released then More −ve will be the value of ΔH_{eg} (higher the E.A.)

$$He + e^- \longrightarrow He^- \Rightarrow \Delta H_{eg} = +ve$$

More +ve value of ΔH_{eg} represents lesser the tendency to accept the e^- & hence lesser will be the E.A.

$$\Delta H_{eg} = -E.A.$$

$$\Delta H_{eg} = -A_e + \frac{5}{2}RT$$

* Successive E.A. :

$O + e^- \longrightarrow O^-$ $\quad \Delta H_{eg_1} = -144$ KJ/mol

$O^- + e^- \longrightarrow O^{-2}$ $\quad \Delta H_{eg_2} = +744$ KJ/mol

---

$O + 2e^- \longrightarrow O^{-2}$ $\quad \Delta H_{total} = +600$ (endo.)

$S + 2e^- \longrightarrow S^{-2}$

$N + 3e^- \longrightarrow N^{-3}$

$P + 3e^- \longrightarrow P^{-3}$

} endo.

FACTORS AFFECTING ELECTRON AFFINITY

(1) Z_{eff} :→

$$E.A \propto Z_{eff}$$

(2) size :→

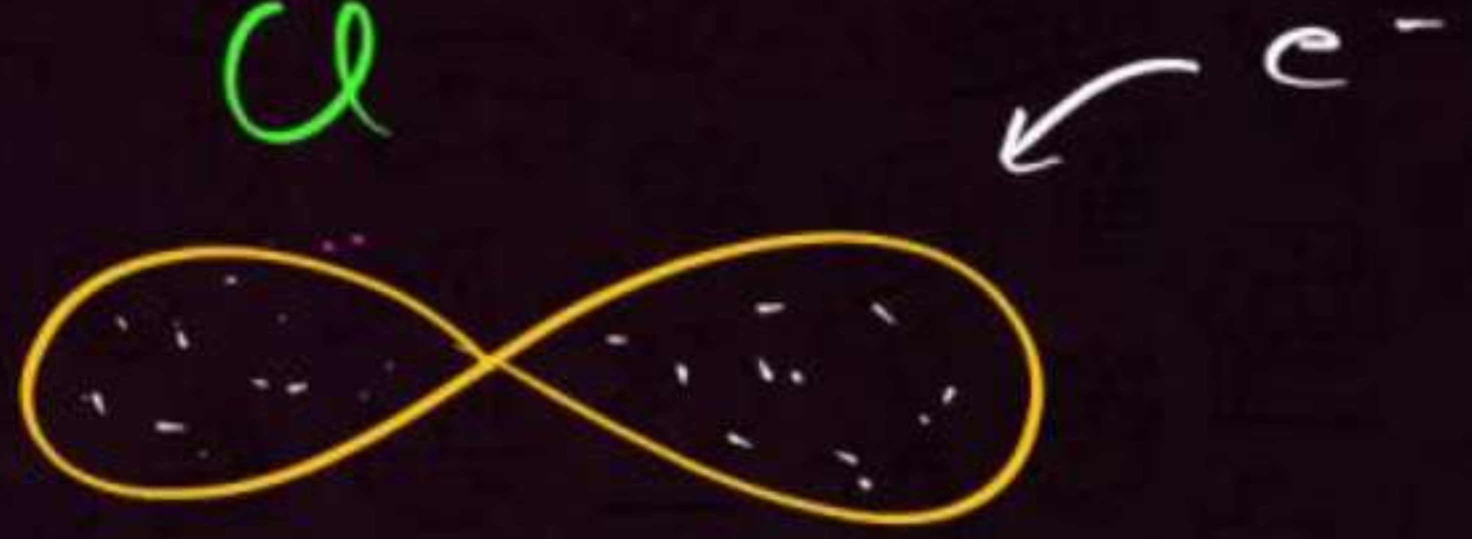
$$E.A. \propto \frac{1}{size}$$

Ex: Cl > Br > I

S > Se > Te

2nd period < 3rd period

F   Cl



(inter e⁻ rep. more)

F < Cl

O < S

N < P

C < Si

Ex:

F < Cl > Br > I

O < S > Se > Te

Imp

$Cl > F > Br > I$

$S > Se > Te > Po > O$

(3) Stable Config. :→

$\Delta H_{eg_1} = +ve$ for Noble gases. $\underbrace{Be, Mg}_{ns^2}$, $\underbrace{N}_{p^3}$

$Na + e^- \rightarrow Na^-$ exo.

$Be + e^- \rightarrow Be^-$ endo.

(4) Panetration Power :→

Li > B

e^- → $2s^1$ ⇓ $2s^2$ $\qquad$ $2p^1$

2^{nd} period :→ Li (Be) B C (N) O F (Ne)

$$Ne < Be < N < B < Li < C < O < F$$

* 3rd period :-

H.W.

Max. E.A = Cl

QUESTION

Which of the following processes involves absorption of energy?

(A) $S(g) + e^- \longrightarrow S^-(g)$

(B) $S^- + e^- \longrightarrow S^{2-}(g)$

(C) $Cl(g) + e^- \longrightarrow Cl^-(g)$

(D) None of these

Ans. ()

QUESTION

Which of following will have the most negative electron gain enthalpy and which the least negative ? F, P, S, Cl

(A) P, Cl

(B) Cl, F

(C) Cl, S

(D) Cl, P

Ans. ()

N, P, S, O, Cl, F, C, Si

* **Hitrick** *

N-family $<$ C-family $<$ O-family $<$ X-family

$N < P < C < Si < O < S < F < Cl$

Relation b/w I.E & E.A :

$$F_{(g)} + e^- \underset{E_1 \downarrow}{\overset{E_1 \uparrow}{\rightleftharpoons}} F^-_{(g)} \quad E_1 \uparrow$$

$$E_1 = E.A. \text{ of } F_{(g)} = I.E. \text{ of } F^-_{(g)}$$

$$Cl_{(g)} + e^- \underset{E_2 \downarrow}{\overset{E_2 \uparrow}{\rightleftharpoons}} Cl^-_{(g)} \Rightarrow E_2 \uparrow$$

$$E_2 = E.A. \text{ of } Cl_{(g)} = I.E. \text{ of } Cl^-_{(g)}$$

I.E. of Cl^- > F^-

I.E. of Cl < F

I.E. order: F, Cl, F^-, Cl^-

$F > Cl > Cl^- > F^-$

QUESTION

Which of the following is correct order of Ionization energy of $\{O, O^{-1}, S, S^{-1}\}$?

$O > S > S^- > O^-$

(A) $O > S > O^- > S^-$

(B) $O > S > S^- > O^-$

(C) $S^- > O^- > O > S$

(D) $S^- > S^+ > O^- > O$

Ans. ()

ELECTRONEGATIVITY

Imp

It is the tendency of a covalently bonded atom to attract shared pair of e^-

χ_A = E.N. of A

χ_B = E.N. of B.

if $\chi_A > \chi_B$

* Note :→ E.N. does not depends on e^- config.

SCALES OF E.N.

(1) Mullikan's Scale :→

$$E.N. = \frac{E.A + I.E.}{2}$$

(2) Pauling Scale :→ based on Bond Energy.

$$\Delta EN \propto \sqrt{\Delta}$$

Δ → ionic Resonance Energy

(F) → Reference 4.0

Li	Be	B	C	N	O	F
1.0	1.5	2.0	2.5	3.0	3.5	4.0
Na	Mg	Al	Si	P	S	Cl
0.9	1.2	1.5	1.8	2.1	2.5	3.0
K						Br
0.8						2.8
Rb						I
0.8						2.5
Cs						
0.7						

H = P = 2.1

N = Cl = 3.0

C = S = I = 2.5

B Al Ga In Tl
2.0 1.5 1.6 1.7 1.8

Table 3.8(a) Electronegativity Values (on Pauling scale) Across the Periods

Atom (Period II)	Li	Be	B	C	N	O	F
Electronegativity	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Atom (Period III)	Na	Mg	Al	Si	P	S	Cl
Electronegativity	0.9	1.2	1.5	1.8	2.1	2.5	3.0

Table 3.8(b) Electronegativity Values (on Pauling scale) Down a Family

Atom (Group I)	Electronegativity Value	Atom (Group 17)	Electronegativity Value
Li	1.0	F	4.0
Na	0.9	Cl	3.0
K	0.8	Br	2.8
Rb	0.8	I	2.5
Cs	0.7	At	2.2

QUESTION

The electronegativity of the following elements increases in the order

(AFMC 2010)

(A) C, N, Si, P

(B) N, Si, C, P

(C) Si, P, C, N

(D) P, Si, N, C

Si < P < C < N

1.8 2.1 2.5 3.0

Ans. ( )

FACTORS AFFECTING E.N.

(1) Zeff →

$$E.N \propto Z_{eff}$$

(2) size →

$$EN \propto \frac{1}{size}$$

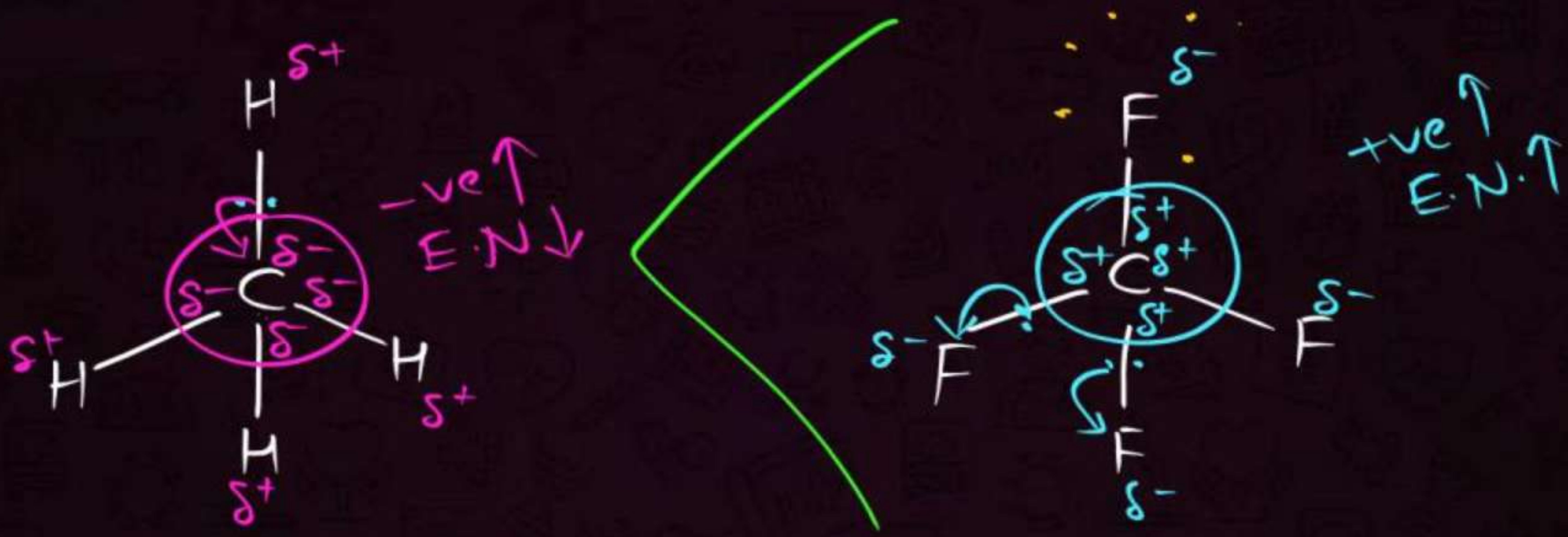
(3) +ve | -ve charge →

$$E.N. \propto \frac{+ve}{-ve}$$

Ex: $Fe^{+2} < Fe^{+3}$

$N^{-} > N^{-2} > N^{-3}$

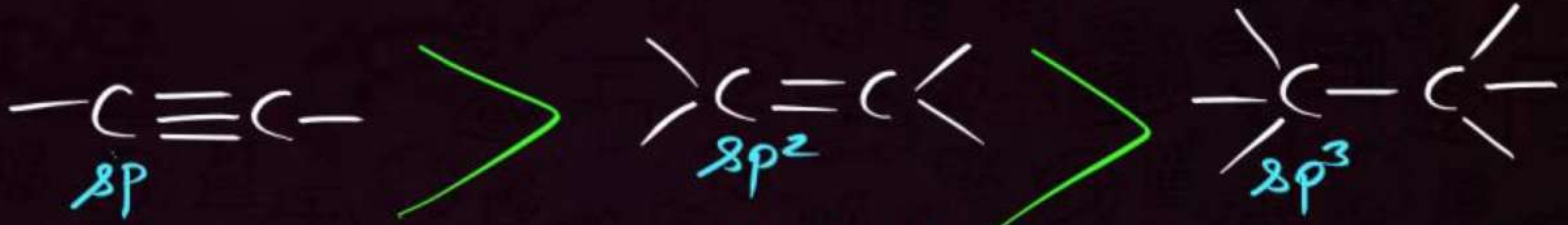
(4) E.N. of Terminal atoms :-



E.N. ∝ E.N. of Terminal atom

(5) % s character :- ↓

E.N. α % s char.



sp	sp²	sp³
50% s	33.3% s	25% s
3.25	2.8	2.5

APPLICATIONS OF E.N.

BOND POLARITY :

$A — B$

$\Delta EN = 0 \Rightarrow$ Non Polar Bond

$\Delta EN \neq 0 \Rightarrow$ Polar.

Ex: Polarity order

$$\underset{2.1\ \ 4.0}{H-F} > \underset{2.1\ \ 3.0}{H-Cl} > \underset{2.1\ \ 2.8}{H-Br} > \underset{2.1\ \ 2.5}{H-I}$$

② METALLIC/NON-METALLIC NATURE :

$$\text{Metallic Nature} \propto \frac{1}{\text{E.N.}}$$

In a Group Metallic Nature ↑se from Top to Bottom

$$\text{Non Metallic Nature} \propto \text{E.N.}$$

in a period Non Metallic Nature ↑se.

(3) IUPAC NAMING OF INORGANIC COMPOUNDS :

$H_2\overset{-2}{O}$ ⟶ Dihydrogen Oxide.

$\overset{+2}{O}\overset{-1}{F_2}$ ⟶ ~~Difluorine oxide~~

~~F_2O~~ Oxygen difluoride ✓

(4) % IONIC CHARACTER :

$$\%\text{I.C.} = 16 \times (\Delta EN) + 3.5\,(\Delta EN)^2$$

$$\text{Cov. Char.} = 100 - \%\text{I.C.}$$

Ex: H — Cl

2.1 3.0

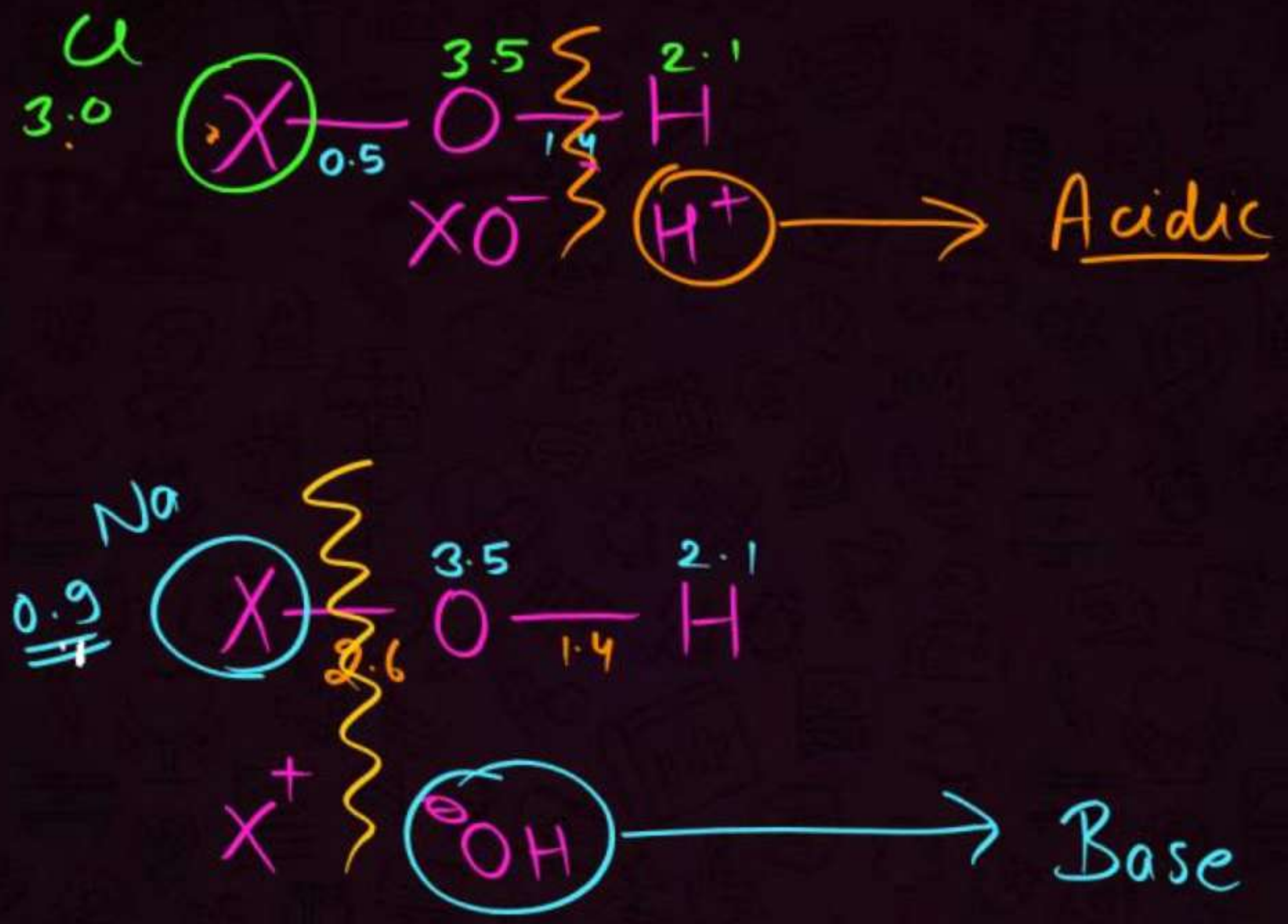
$\Delta EN = 0.9$

Imp

(5) NATURE OF OXIDES/HYDROXIDES :

Non Metal oxide/Hydroxide ⇒ Acidic

Metal oxides/Hydroxides ⇒ Basic


Cl
3.0
X
0.5
3.5
O
1.4
2.1
H
XO⁻
H⁺
Acidic
Na
0.9
X
2.6
3.5
O
1.4
2.1
H
X⁺
OH
Base

(1) $HOF > HOCl > HOBr > HOI$

(2) $H\overset{+1}{Cl}O < H\overset{+3}{Cl}O_2 < H\overset{+5}{Cl}O_3 < H\overset{+7}{Cl}O_4$

(3) $N_2O_5 > P_2O_5$

(4) $\overset{+6}{S}O_3 > \overset{+4}{S}O_2$

(5) $\overset{+5}{N_2}O_5 > \overset{+3}{N_2}O_3$

* **Amphoteric Oxides :-** (can behave as Acid as well as base both)

Pb	Zn	Be	Al	Ga	Sn	Cr^{+3}	Mn^{+4}	Sb^{+3}	As^{+3}	V
PbO	ZnO	BeO	Al_2O_3	Ga_2O_3	SnO	Cr_2O_3	MnO_2	Sb_2O_3	As_2O_3	
PbO_2					SnO_2		Mn_2O_3			
Pb_3O_4							Mn_3O_8			V_2O_5

* **Neutral Oxides :-** N_2O, CO, NO, H_2O

QUESTION

Which of the following is different from other three oxides?

(A) MgO Basic

(B) SnO

(C) ZnO Amph.

(D) PbO

Ans. ()

QUESTION

Which one of the following orders present the correct sequence of the increasing basic nature of the given oxides?

(A) $Al_2O_3 < MgO < Na_2O < K_2O$

(B) $MgO < K_2O < Al_2O_3 < Na_2O$

(C) $Na_2O < K_2O < MgO < Al_2O_3$

(D) $K_2O < Na_2O < Al_2O_3 < MgO$

Ans. ()

QUESTION

Incorrect order of basic character:

(A) $Ag_2O > PbO$

(B) $MgO > ZnO$

(C) $Fe_2O_3 > Al_2O_3$

(D) $Ag_2O > Cu_2O$

Ans. ()

GENESIS OF PERIODIC TABLE

DOBEREINER'S TRIADS : → pair of 3 elements

Table 3.1 Dobereiner's Triads

Element	Atomic weight	Element	Atomic weight	Element	Atomic weight
Li	7	Ca	40	Cl	35.5
Na	23	Sr	88	Br	80
K	39	Ba	137	I	127

(K, Rb, Cs)
(Sc, Y, La)
(P, As, Sb)
(S, Se, Te) (H, F, Cl)

$\frac{7+39}{2} = 23$

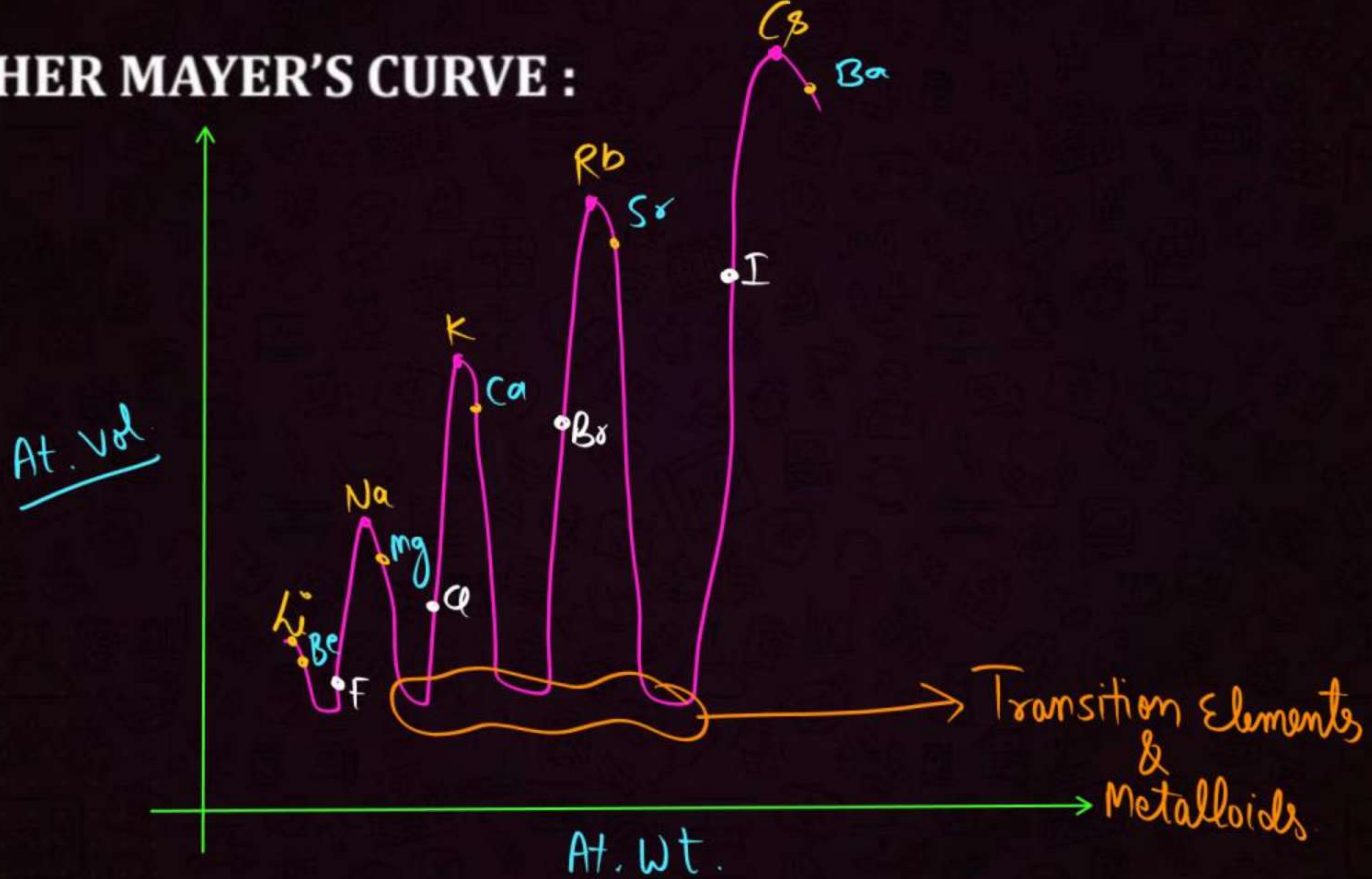
NEWLAND'S OCTAVE LAW :

सा रे गा मा पा धा नी सा

Table 3.2 Newlands' Octaves

Element	**Li**	**Be**	**B**	**C**	**N**	**O**	**F**
At. wt.	7	9	11	12	14	16	19
Element	**Na**	**Mg**	**Al**	**Si**	**P**	**S**	**Cl**
At. wt.	23	24	27	29	31	32	35.5
Element	**K**	**Ca**					
At. wt.	39	40					

LOTHER MAYER'S CURVE :



MENDELEEV'S PERIODIC TABLE :

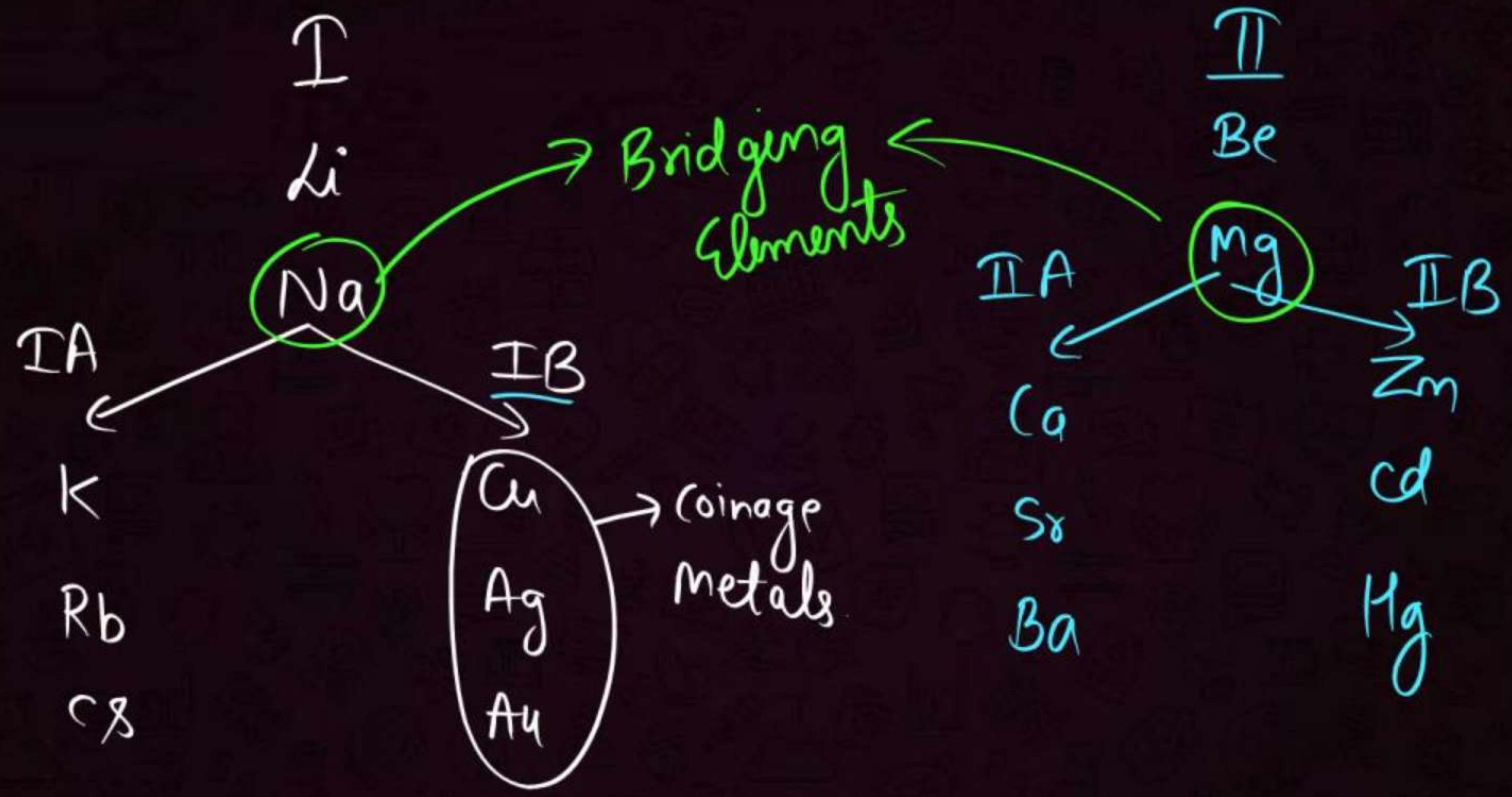
→ 63 elements

→ Based on Atomic Wt.

→ 8 vertical columns (Groups) & 12 horizonal rows (series) — 7 period

→ 9^{th} group was added after discovery of Noble gases & named as group zero

→ Group 1 to 7 were divided into 2 subgroups.


I
Li
Na
IA
IB
K
Rb
Cs
Cu
Ag
Au
Coinage Metals
Bridging Elements
II
Be
Mg
IIA
IIB
Ca
Sr
Ba
Zn
Cd
Hg

VIII

Fe	Co	Ni
Ru	Rh	Pd
Os	Ir	Pt

गंगा [Ga] → Eka Aluminium Al

से Sc → Eka Boron B

जमता Ge → Eka Silicon Si

तक Tc → Eka Manganese Mn

Correction in At. Wt. → U Be In Pt Au

* Drawbacks

① Position of H

② Position of isotopes

③ Anomalous Pairs : (Ar, K)   (Te, I)

39.9   39.1

Acidic Nature :

1. $\overset{+4}{C}O_2 < \overset{+5}{N_2}O_5$
2. $\overset{+5}{N_2}O_5 > \overset{+5}{P_2}O_5\ (P_4O_{10})$
3. $\overset{+3}{N_2}O_3 > \overset{+3}{P_2}O_3 / \overset{+3}{P_4}O_6 > \overset{+3}{As_2}O_3$
4. $\overset{+5}{N_2}O_5 > \overset{+5}{P_2}O_5 > \overset{+5}{As_2}O_5$
5. $CO_2 > SiO_2$
6. $\overset{+5}{P_2}O_5 | P_4O_{10} > \overset{+3}{P_2}O_3 | P_4O_6$ (+ve ↑ E.N. ↑ Non metallic ↑ Acidic ↑)

E.N. ↑
Non Metallic Nature ↑
Acidic ↑

Basic Nature :

(7) $Li_2O < Na_2O < K_2O < Rb_2O < Cs_2O$

(8) $BeO < MgO < CaO < SrO < BaO$

(9) $Li_2O > BeO > B_2O_3 > CO_2 > N_2O_5$

(10) $Na_2O > MgO > Al_2O_3 > SiO_2 > P_2O_5$

E.N. ↑ Non Metallic ↑ Metallic ↓ Basic ↓

E.N. ↓
Metallic ↑
Basic ↑

Acidic Nature :- ↓ (oxy Acids)

(11) $HOF > HClO > HBrO > HIO$

(12) $H\overset{+1}{Cl}O < H\overset{+3}{Cl}O_2 < H\overset{+5}{Cl}O_3 < H\overset{+7}{Cl}O_4$

(13) $HIO < HIO_2 < HIO_3 < HIO_4$

(14) $H_2CO_3 < HNO_3$

(15) $H\overset{+5}{N}O_3 > H\overset{+3}{N}O_2$

(16) $HNO_3 > H_3PO_4$

(17) $H_2\overset{+6}{S}O_4 > H_2\overset{+4}{S}O_3$

(18) $H_2SO_4 > H_2SeO_4$

Basic Nature :

(19) $Be(OH)_2 < Mg(OH)_2 < Ca(OH)_2 < Sr(OH)_2 < Ba(OH)_2$

(20) $LiOH < NaOH < KOH < RbOH < CsOH$

(21) $NaOH > Mg(OH)_2 > Al(OH)_3$

* Remember *

Acidic Nature : $H_3PO_4 < H_3PO_3 < H_3PO_2$

Reducing Nature : $H_3PO_4 < H_3PO_3 < H_3PO_2$

Table 2.6 Electronic Configurations of the Elements

Element	Z	1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	7s
H	1	1																	
He	2	2																	
Li	3	2	1																
Be	4	2	2																
B	5	2	2	1															
C	6	2	2	2															
N	7	2	2	3															
O	8	2	2	4															
F	9	2	2	5															
Ne	10	2	2	6															
Na	11	2	2	6	1														
Mg	12	2	2	6	2														
Al	13	2	2	6	2	1													
Si	14	2	2	6	2	2													
P	15	2	2	6	2	3													
S	16	2	2	6	2	4													
Cl	17	2	2	6	2	5													
Ar	18	2	2	6	2	6													
K	19	2	2	6	2	6		1											
Ca	20	2	2	6	2	6		2											
Sc	21	2	2	6	2	6	1	2											
Ti	22	2	2	6	2	6	2	2											
V	23	2	2	6	2	6	3	2											
Cr*	24	2	2	6	2	6	5	1											
Mn	25	2	2	6	2	6	5	2											
Fe	26	2	2	6	2	6	6	2											
Co	27	2	2	6	2	6	7	2											
Ni	28	2	2	6	2	6	8	2											
Cu*	29	2	2	6	2	6	10	1											
Zn	30	2	2	6	2	6	10	2											

Ga	31	2	2	6	2	6	10	2	1			
Ge	32	2	2	6	2	6	10	2	2			
As	33	2	2	6	2	6	10	2	3			
Se	34	2	2	6	2	6	10	2	4			
Br	35	2	2	6	2	6	10	2	5			
Kr	36	2	2	6	2	6	10	2	6			
Rb	37	2	2	6	2	6	10	2	6		1	
Sr	38	2	2	6	2	6	10	2	6		2	
Y	39	2	2	6	2	6	10	2	6	1	2	
Zr	40	2	2	6	2	6	10	2	6	2	2	
Nb*	41	2	2	6	2	6	10	2	6	4	1	
Mo*	42	2	2	6	2	6	10	2	6	5	1	
Tc	43	2	2	6	2	6	10	2	6	5	2	
Ru*	44	2	2	6	2	6	10	2	6	7	1	
Rh*	45	2	2	6	2	6	10	2	6	8	1	
Pd*	46	2	2	6	2	6	10	2	6	10		
Ag*	47	2	2	6	2	6	10	2	6	10	1	
Cd	48	2	2	6	2	6	10	2	6	10	2	
In	49	2	2	6	2	6	10	2	6	10	2	1
Sn	50	2	2	6	2	6	10	2	6	10	2	2
Sb	51	2	2	6	2	6	10	2	6	10	2	3
Te	52	2	2	6	2	6	10	2	6	10	2	4
I	53	2	2	6	2	6	10	2	6	10	2	5
Xe	54	2	2	6	2	6	10	2	6	10	2	6

** Elements with exceptional electronic configurations*

Element	Z	1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	7s
Cs	55	2	2	6	2	6	10	2	6	10		2	6			1			
Ba	56	2	2	6	2	6	10	2	6	10		2	6			2			
La*	57	2	2	6	2	6	10	2	6	10		2	6	1		2			
Ce*	58	2	2	6	2	6	10	2	6	10	2	2	6			2			
Pr	59	2	2	6	2	6	10	2	6	10	3	2	6			2			
Nd	60	2	2	6	2	6	10	2	6	10	4	2	6			2			
Pm	61	2	2	6	2	6	10	2	6	10	5	2	6			2			
Sm	62	2	2	6	2	6	10	2	6	10	6	2	6			2			
Eu	63	2	2	6	2	6	10	2	6	10	7	2	6			2			
Gd*	64	2	2	6	2	6	10	2	6	10	7	2	6	1		2			
Tb	65	2	2	6	2	6	10	2	6	10	9	2	6			2			
Dy	66	2	2	6	2	6	10	2	6	10	10	2	6			2			
Ho	67	2	2	6	2	6	10	2	6	10	11	2	6			2			
Er	68	2	2	6	2	6	10	2	6	10	12	2	6			2			
Tm	69	2	2	6	2	6	10	2	6	10	13	2	6			2			
Yb	70	2	2	6	2	6	10	2	6	10	14	2	6			2			
Lu	71	2	2	6	2	6	10	2	6	10	14	2	6	1		2			
Hf	72	2	2	6	2	6	10	2	6	10	14	2	6	2		2			
Ta	73	2	2	6	2	6	10	2	6	10	14	2	6	3		2			
W	74	2	2	6	2	6	10	2	6	10	14	2	6	4		2			
Re	75	2	2	6	2	6	10	2	6	10	14	2	6	5		2			
Os	76	2	2	6	2	6	10	2	6	10	14	2	6	6		2			
Ir	77	2	2	6	2	6	10	2	6	10	14	2	6	7		2			
Pt*	78	2	2	6	2	6	10	2	6	10	14	2	6	9		1			
Au*	79	2	2	6	2	6	10	2	6	10	14	2	6	10		1			
Hg	80	2	2	6	2	6	10	2	6	10	14	2	6	10		2			
Tl	81	2	2	6	2	6	10	2	6	10	14	2	6	10		2	1		
Pb	82	2	2	6	2	6	10	2	6	10	14	2	6	10		2	2		
Bi	83	2	2	6	2	6	10	2	6	10	14	2	6	10		2	3		
Po	84	2	2	6	2	6	10	2	6	10	14	2	6	10		2	4		
At	85	2	2	6	2	6	10	2	6	10	14	2	6	10		2	5		
Rn	86	2	2	6	2	6	10	2	6	10	14	2	6	10		2	6		

Fr	87	2	2	6	2	6	10	2	6	10	14	2	6	10		2	6		1
Ra	88	2	2	6	2	6	10	2	6	10	14	2	6	10		2	6		2
Ac	89	2	2	6	2	6	10	2	6	10	14	2	6	10		2	6	1	2
Th	90	2	2	6	2	6	10	2	6	10	14	2	6	10		2	6	2	2
Pa	91	2	2	6	2	6	10	2	6	10	14	2	6	10	2	2	6	1	2
U	92	2	2	6	2	6	10	2	6	10	14	2	6	10	3	2	6	1	2
Np	93	2	2	6	2	6	10	2	6	10	14	2	6	10	4	2	6	1	2
Pu	94	2	2	6	2	6	10	2	6	10	14	2	6	10	6	2	6		2
Am	95	2	2	6	2	6	10	2	6	10	14	2	6	10	7	2	6		2
Cm	96	2	2	6	2	6	10	2	6	10	14	2	6	10	7	2	6	1	2
Bk	97	2	2	6	2	6	10	2	6	10	14	2	6	10	8	2	6	1	2
Cf	98	2	2	6	2	6	10	2	6	10	14	2	6	10	10	2	6		2
Es	99	2	2	6	2	6	10	2	6	10	14	2	6	10	11	2	6		2
Fm	100	2	2	6	2	6	10	2	6	10	14	2	6	10	12	2	6		2
Md	101	2	2	6	2	6	10	2	6	10	14	2	6	10	13	2	6		2
No	102	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6		2
Lr	103	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	1	2
Rf	104	2	2	6	2	6	10	2	6	10	14	2	6	10	10	2	6	2	2
Db	105	2	2	6	2	6	10	2	6	10	14	2	6	10	11	2	6	3	2
Sg	106	2	2	6	2	6	10	2	6	10	14	2	6	10	12	2	6	4	2
Bh	107	2	2	6	2	6	10	2	6	10	14	2	6	10	13	2	6	5	2
Hs	108	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	6	2
Mt	109	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	7	2
Ds	110	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	8	2
Rg**	111	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	10	1

*** Elements with atomic number 112 and above have been reported but not yet fully authenticated and named.*

Homework

Practice Sheet

FOR NOTES & DPP CHECK DESCRIPTION


THANK YOU