



RADIANT

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Chemistry

The Language of Chemistry

Lecture - 01

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Physics Wallah

Topics *to be covered*

1 Atom and Molecules



2 Valency

3 Radical

4 'KBC'

5 **Introduction to Atom**





MATTER



→ when we go on dividing
Matter, we get smallest particle



'Atom'

'Democritus'



'Leucippus'





Molecule

Hydrogen Atom }
oxygen Atom }



CO₂, H₂O, CH₄, H₂, O₂

→ Combination of two or more atoms in a fixed ratio

CO₂ H₂

CO O₂

CH₄



Atomicity

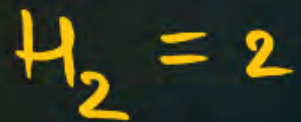


Monoatomic (single atom)

Diatomic (two)

Triatomic (3) } Polyatomic

→ Total no. of atoms in a molecule.



Note: All inert gases are monoatomic

(He, Ar, Kr, Xe, Rn)

Question



Atomicity of oxygen gas?

$O \times$
 $O_2 \checkmark$

- A 2
- B 3
- C 4
- D 1

Atomicity of oxygen Ozone?



- A 2
- B 3
- C 1
- D 4



Dalton's symbols of Elements



Hydrogen		Iron	
Carbon		Copper	
Oxygen		Silver	
Phosphorus		Gold	
Sulphur		Lead	
Platinum		Mercury	



Symbol of an Element

H Li O }
He B }



(i) In chemistry, every element is represented by a symbol. Chemical symbols are the abbreviated forms of elements. In general, each element's name is abbreviated as a one-or two-letter as a chemical symbol.

Hydrogen
→

He C
Xe



Symbol of an Element

Lithium → (Li)



(ii) If the symbol of an element is represented by **double letter**, then by convention, the first letter of a chemical symbol is a capital letter, while the second letter is a smaller letter.

Be

Br

Ba



Symbol of an Element



(iii) In some cases, the elements have symbols that derive from earlier, mostly Latin names. Therefore, the chemical symbol of these elements may not contain any letters from the English name.

Iron = (Fe)

gold = Gt / GtOX
↳ Au

Silver → s / siX

↳ Ag



Significance of a symbol

A symbol of an element represents:

1. One atom of an element
2. Name of an element
3. Quantity of the element equal in mass to its atomic mass.





Lets take an example of oxygen



The symbol of oxygen is O. It represents:

1. One atom of oxygen ✓
2. The element oxygen. ✓
3. 16 parts by weight of oxygen. ✓

16u / 16 a.m.u



Symbols of elements



	Name of Element	Symbol
1	<u>Hydrogen</u>	H
2	Helium	He
3	Lithium	Li
4	Beryllium	Be
5	Boron	B
6	Carbon	C
7	Nitrogen	N

Name of Element		Symbol
8	Oxygen	O
9	Fluorine	F
10	Neon	Ne
11	Sodium	So x Na
12	<u>Magnesium</u>	Mg
13	<u>Aluminium</u>	Al
14	<u>Silicon</u>	Si
15	Phosphorus	P
16	Sulphur	S
17	<u>Chlorine</u>	cl
18	<u>Argon</u>	Ar

BR X



Name of Element		Symbol
19	Potassium	K
20	Calcium	Ca
21	Barium	Ba
22	Bromine	Br
23	<u>Cobalt</u>	Co
24	Gold	Au
25	Iodine	I
26	Iron	Fe
27	Lead	Pb
28	Uranium	U
29	Zinc	Zn



Symbols of elements

Imp.



Name of Element	Latin Name	Symbol
Silver	Argentum	Ag
Copper	Cuprum	Cu
Gold	Aurum	Au
Iron	Ferrum	Fe
Potassium	Kalium	K
Sodium	Natrium	Na
Lead	Plumbum	Pb
✓ Antimony	Stibium	Sb
✓ Tungsten	Wolfram	W

Modern atomic symbols are based on the method proposed by :

- A Bohr
- B Dalton
- C Berzelius
- D Alchemist

Correct symbol of sodium?

A S ✗

B NA ✗

C So ✗

D Na ✓





Valency



- The valency of an element is a measure of its combining power with other elements.
- It is the property of an element that determines the number of other atoms with which an atom of the element can combine.



Modern Definition of Valency

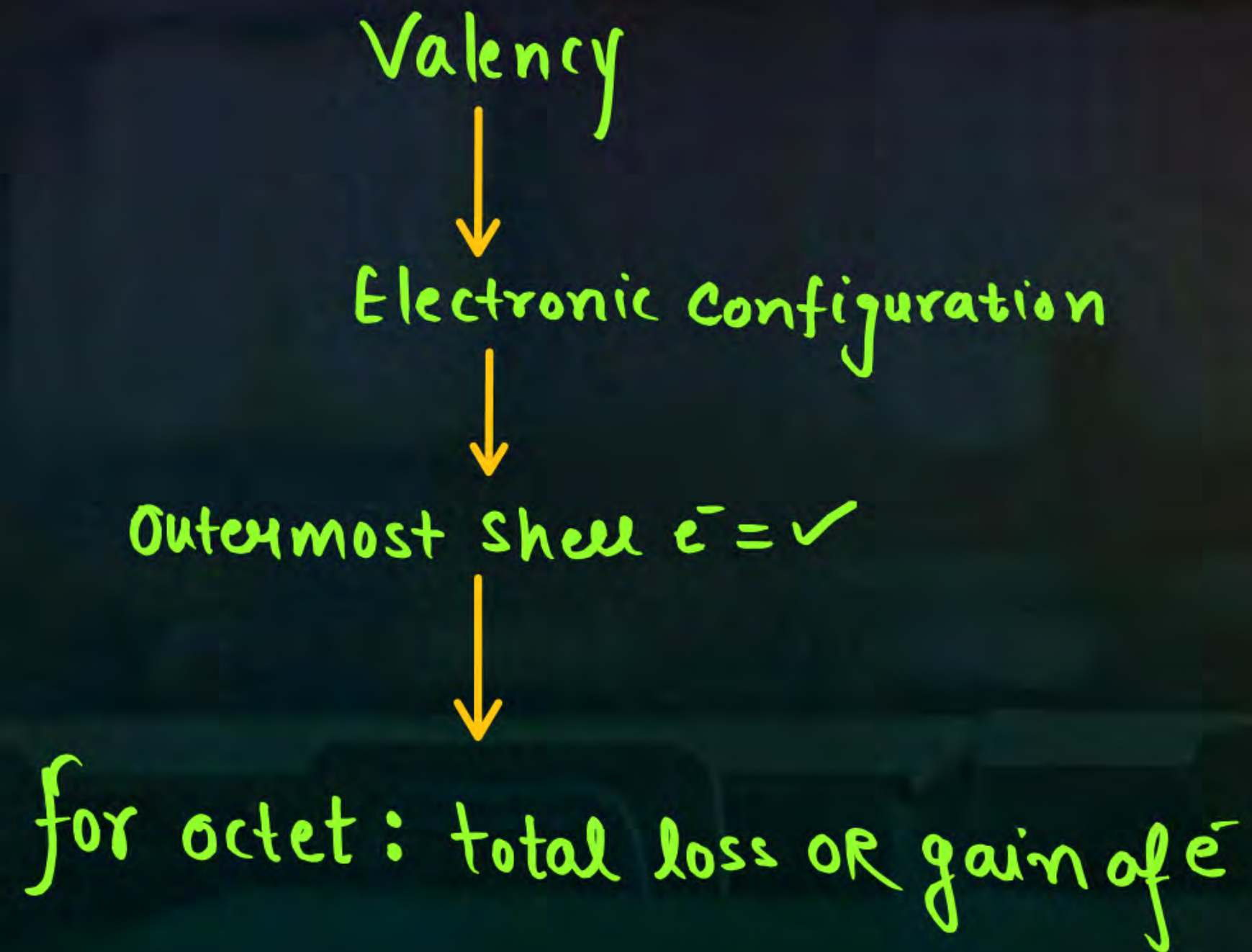
gmp



{ The number of electrons that an atom can lose, gain or share during a chemical reaction is called its valency. -----

(for the formation of octet)

#BM :-
vision



Atomic no = no. of p^+

Neutral atom



no. of p^+ = no. of e^-

Na : Atomic No = $11e^-$

($2n^2$ Rule)

K(2) L(8) M(1)

loss of $1e^-$

Outermost shell = $1e^-$

gain of $7e^-$

Valency = 1



Ion

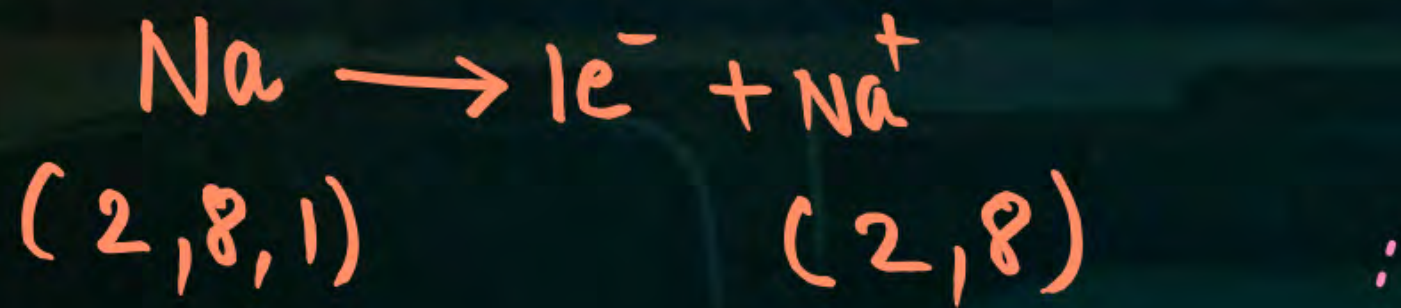


Ions are charged atom

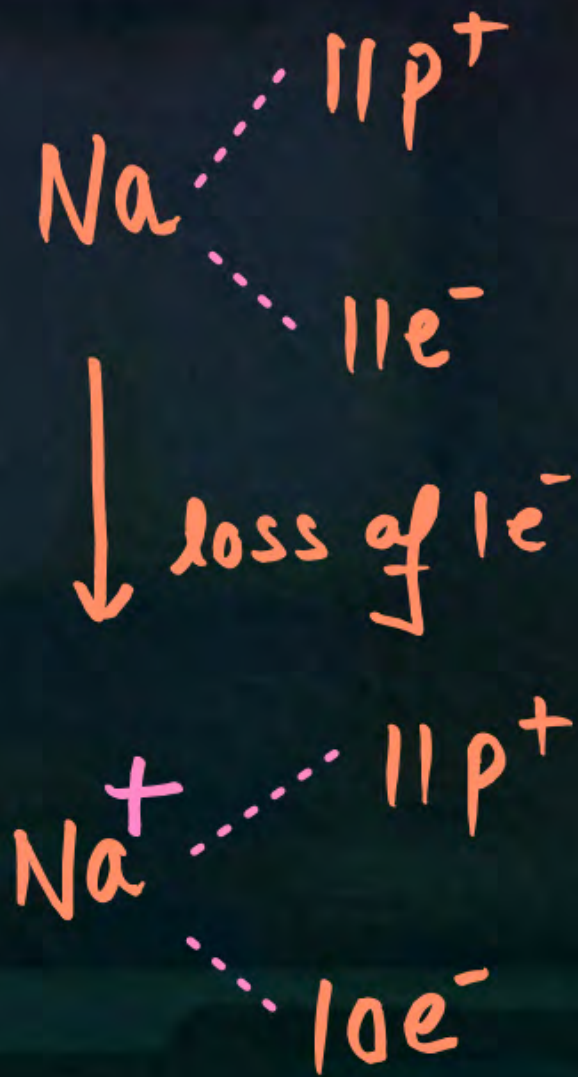
Cation (+ve)

Anion (-ve)

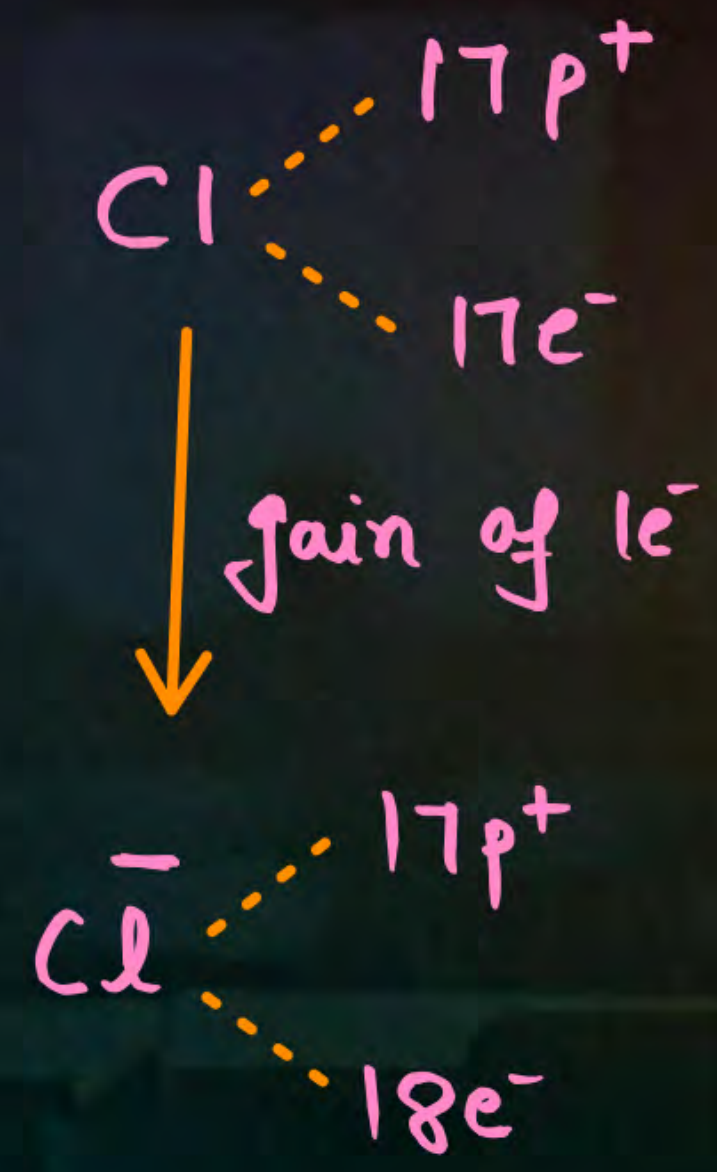
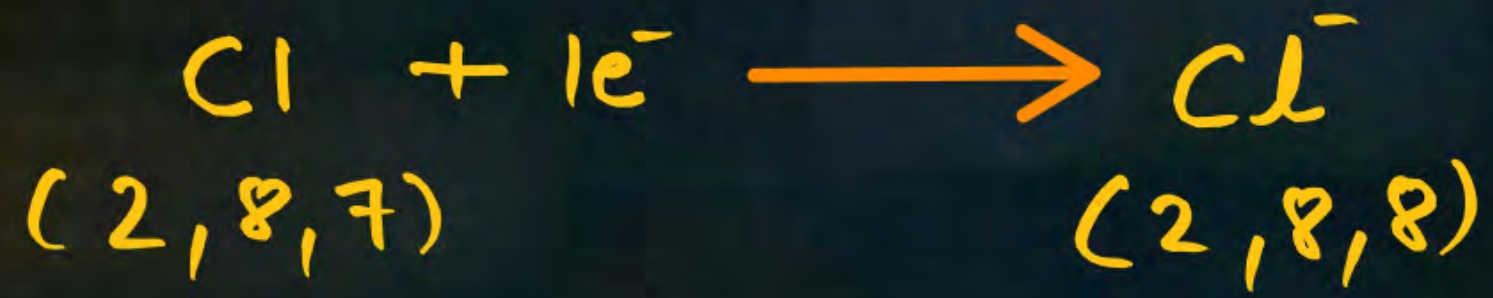
(a) formation of cation:



Formation of Cation



Formation of Anion



BM Vision 2

1.) loss of $e^- \Rightarrow$ Cation (+ve)

Jitne e^- ka loss Hoga utnatti
+ve charge

2.) gain of $e^- =$ anion (-ve)

Question



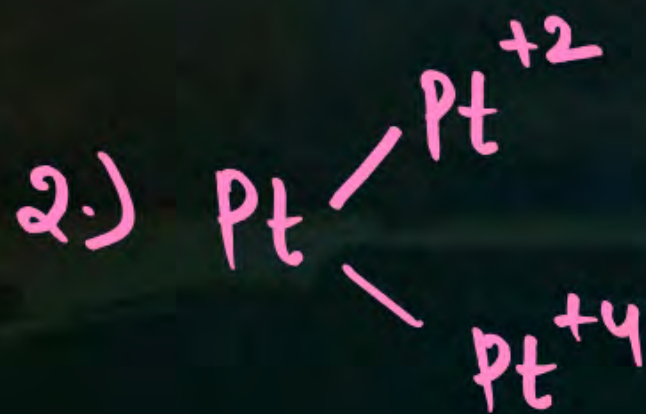
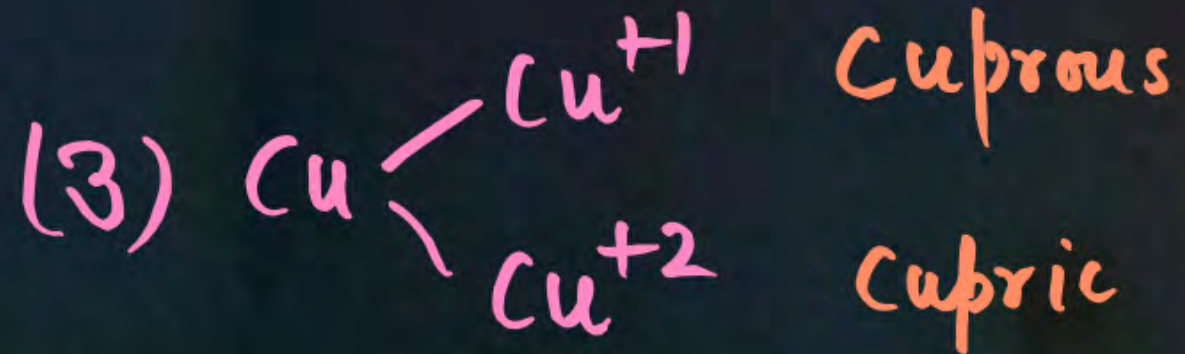
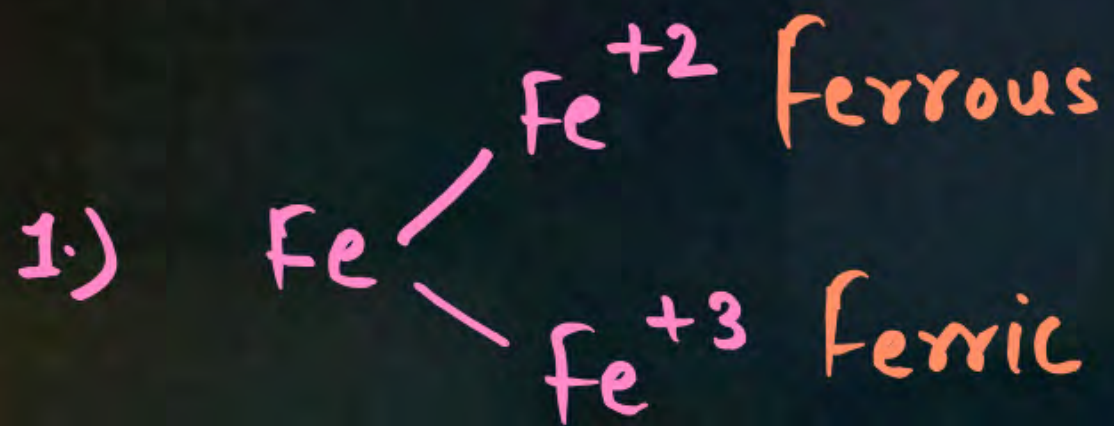
Ion is _____.

(A) Charged atom

(B) Neutral atom



Variable valency



Charge adhic \rightarrow ic
Charge less \rightarrow ous



Examples of Variable Valency



gmp

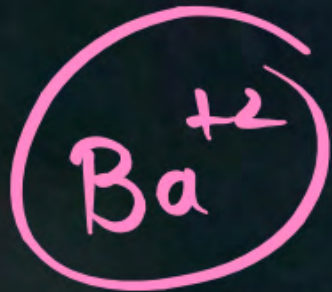
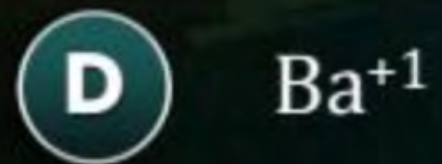
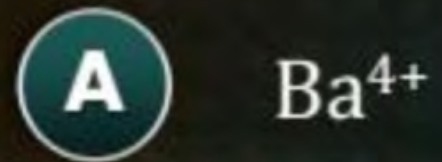
Metal	Valency	Name of Compound Formed		Formula
<i>Fe</i> Iron	2	Ferrous ✓	[Iron (II)] oxide	FeO
	3	Ferric ✓	[Iron (III)] oxide	Fe ₂ O ₃
<i>Cu</i> Copper	1	Cuprous ✓	[Copper (I)] oxide	Cu ₂ O
	2	Cupric ✓	[Copper (II)] oxide	CuO
<i>Hg</i> Mercury	1	Mercurous ✓	[Mercury (I)] oxide	Hg ₂ O
	2	Mercuric ✓	[Mercury (II)] oxide	HgO
Lead <i>Pb</i>	2	Plumbous ✓	[Lead (II)] oxide	PbO
	4	Plumbic ✓	[Lead (IV)] oxide	PbO ₂
Tin <i>Sn</i>	2	Stannous	[Tin (II)] chloride	SnCl ₂
	4	Stannic	[Tin (IV)] chloride	SnCl ₄



1. An element with symbol C. *Carbon*
2. The number of electrons present in the outermost shell of the atoms of an element. *Valence e^-*
3. The elements with 4, 5, 6 and 7 valence electrons. *Non-Metals*
4. The number of atoms present in a molecule of an element or a compound.

Atomicity

Which one is correct?



Notes:
Imp.

1. Oxygen..... is not a monovalent element.
2. He, Ne, Ar..... is not a divalent element.
3. The elements with 1, 2, or 3 valence electrons are termed as Metal.....
4. Na..... the element, does not show variable valency.
5. Fe, Cu, Pt
Hg, Sn..... show variable valency.

Which of the following elements has the symbol 'K'?

- A** Krypton
- B** Potassium
- C** Calcium
- D** Phosphorus

B

The symbol 'Pb' stands for which element?

- A** Phosphorus *P*
- B** Platinum *Pt*
- C** Lead *Pb*
- D** Lithium *Li*


Identify the element with the symbol 'Ag'.

- A** Argon
- B** Aluminium
- C** Antimony
- D** Silver

Which of the following pairs is incorrectly matched?

- A** Na – Sodium ✓
- B** Fe – Iron ✓
- C** Au – Gold ✓
- D** Sn – Silicon ✗ Si

What is the correct symbol for the element 'Phosphorus'?

- A** P ✓ 
- B** Ph
- C** Po
- D** Ps

Question



Unscramble: "ROPESUH"

What is the correct element name?

- A** Phosphorus
- B** Sulphur
- C** Rhodium
- D** Helium

A

Unscramble: "GINYTROEN"

What is the correct element name?

- A** Nitrogen
- B** Oxygen
- C** Neon
- D** Iron

Question



Unscramble: "MUIALNUI"

Which element is hidden here?

- A** Aluminium
- B** Uranium
- C** Indium
- D** Sodium

Unscramble: "CALUIM"
Identify the element:

- A** Calcium
- B** Aluminium
- C** Sulphur
- D** Cobalt



Homework



→ Notes

→ Revision

→ 8th - 9th lec (yt) → Notes



BHARTI MAAM

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Thank You

