

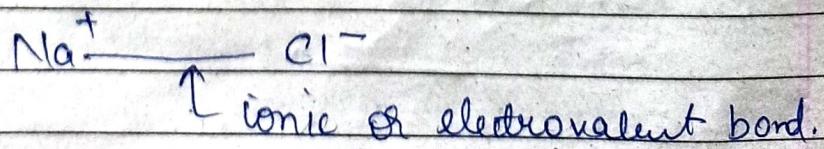
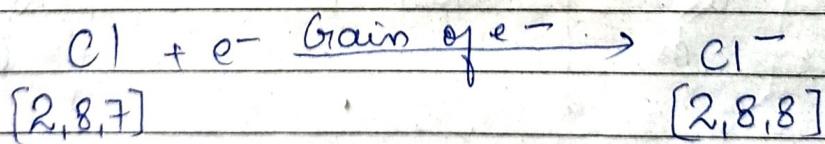
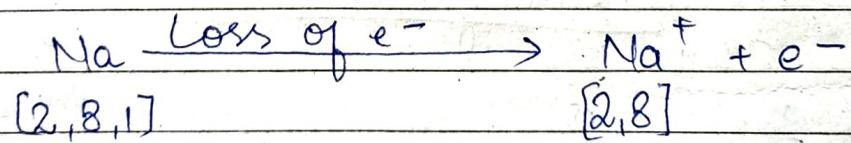
Chemical bonding

An atom of the element undergo bond formation by decreasing energy and increasing stability..
Stability can be achieve by -

- 1) Transfer of electron \rightarrow Electrovalent bond or ionic bond
- 2) Sharing of electron \rightarrow Co-valent bond.
- 3) By transfer as well as sharing \rightarrow Co-ordinate bond.

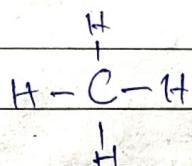
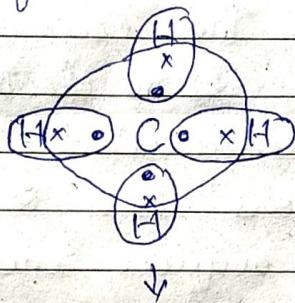
1) Electrovalent bond \rightarrow A bond formed between two or more atoms by the complete transfer of one or more electrons from one atom to another. Initially cation and anion are formed which are held together by strong electrostatic force of attraction called ionic bond.

eg -



2) Co-valent bond \Rightarrow A co-valent bond is formed by sharing of electrons between two or more atoms. Sharing is done by overlapping of incomplete filled orbitals.

e.g. Formation of methane.



Valency \Rightarrow valency is a Latin word "valentia" which means capacity. It has various definitions -

- i) The combining capacity of an element is called valency.
- ii) The No. of electrons lost, gained or shared by an atom of an element to acquire noble gas configuration is called valency.
etc.

Types of valency :- There are two types of valency →

- 1) Electrovalency and
- 2) Co-valency.

1) Electrovalency :- The capacity of an element to form electrovalent or ionic bond is termed as electrovalency. It is measured in terms of electrons lose or gained by an atom of the element to acquire inert gas configuration.



Electrovalency of Na = 1

Co-valency of Cl = 1

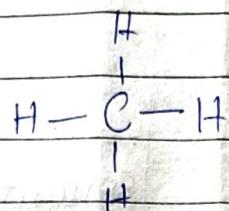


Electrovalency of Ca = 2

Co-valency of Cl = 1

2) Co-valency :- It is defined as the number of co-valent bond formed by an atom of an element. It is measured in terms of number of electron contributed by an atom of the element for sharing with other atom, so as to acquire noble gas configuration.

eg -



Co-valency of Carbon = 4

Co-valency of Hydrogen = 1

Distinction between electrovalent and co-valent compounds.

Electrovalent Compound

- 1) They are formed by loss or gain (transfer) of electrons
- 2) They are crystalline solid at room temperature
- 3) They have high melting and boiling point
- 4) They are hard and brittle
- 5) They are bad conductor in the solid state but excellent conductor in molten state

Co-valent Compound

- They are formed by mutual sharing of electrons
- They are gases, liquid or soft solids at room temperature
- They have low melting and boiling point
- They are soft and waxy
- Bad conductor of electricity

(5)

Electrovalent Comp.

Co-valent compound

6) Freely soluble in water and other polar solvents but insoluble in non-polar solvent

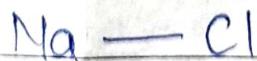
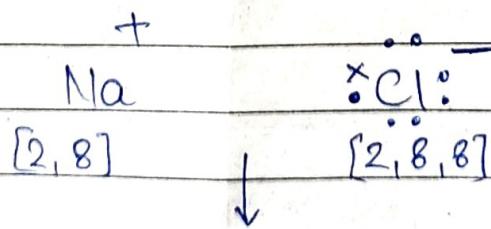
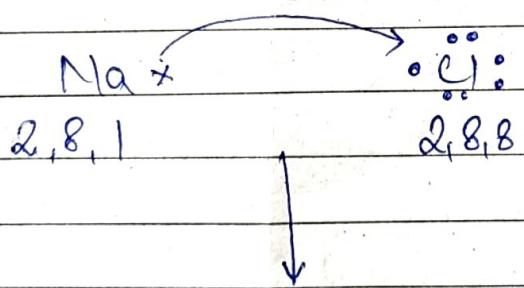
Usually insoluble in polar solvents and water.

7) They undergo ionic reaction with very high rate

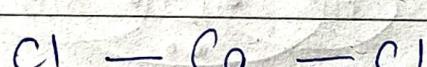
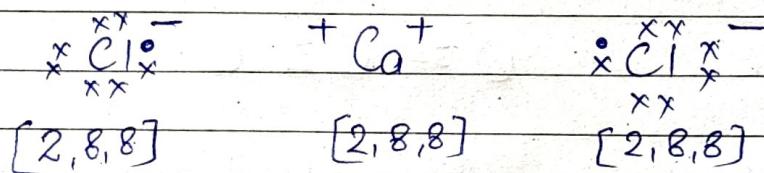
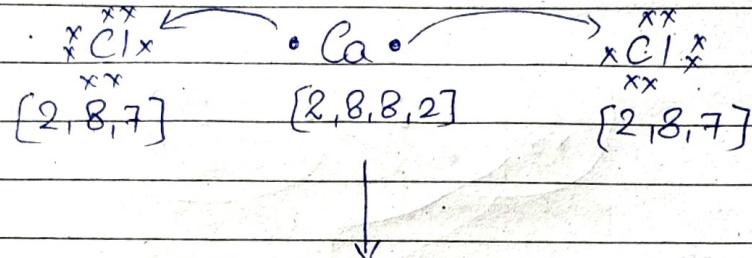
They undergo molecular reaction with slow rate

Formation of Compounds.

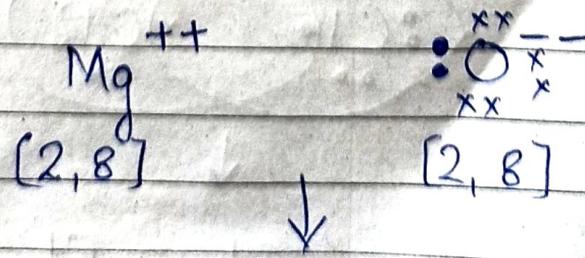
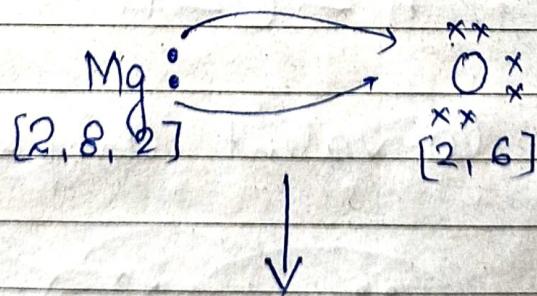
1) $\text{NaCl} \rightarrow \text{ionic compound.}$



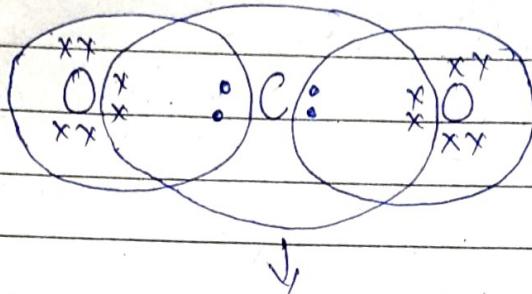
2) CaCl_2 - ionic compound



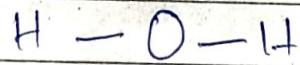
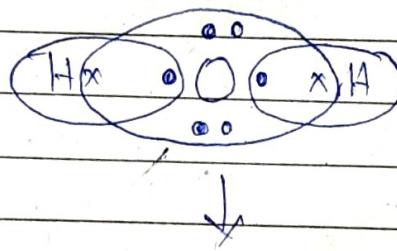
3) MgO - ionic compound.



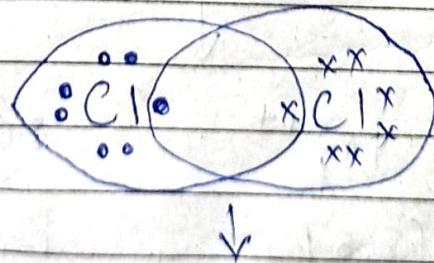
4) CO_2 - Co-valent Compound.



5) H_2O → Co-valent compound.



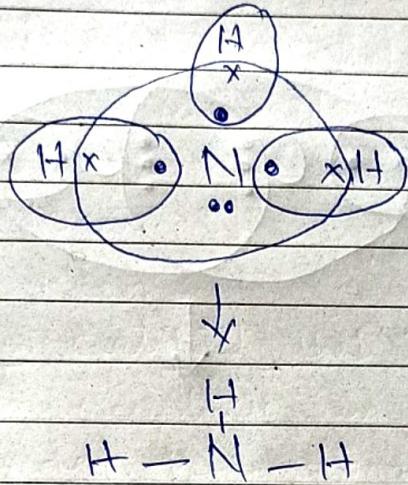
6) Cl_2 → Co-valent Compound.



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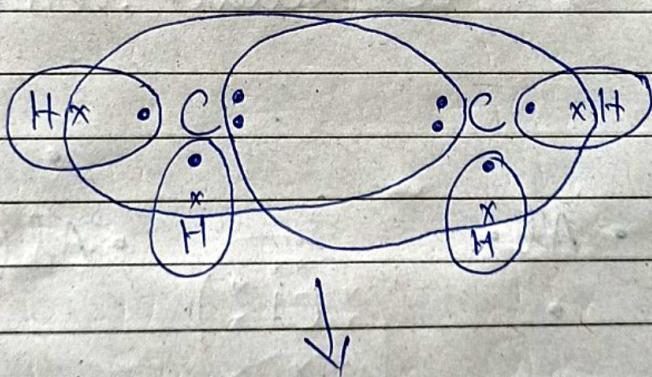
7)

$\text{NH}_3 \rightarrow$ Co-valent Compound.



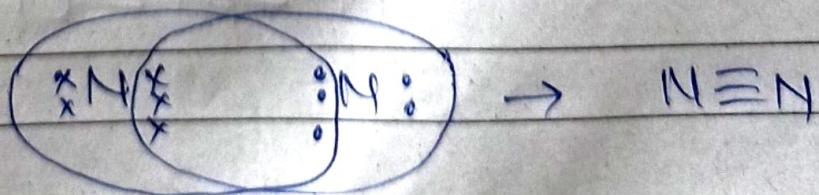
8)

$\text{C}_2\text{H}_4 \rightarrow$ Co-valent Compound.

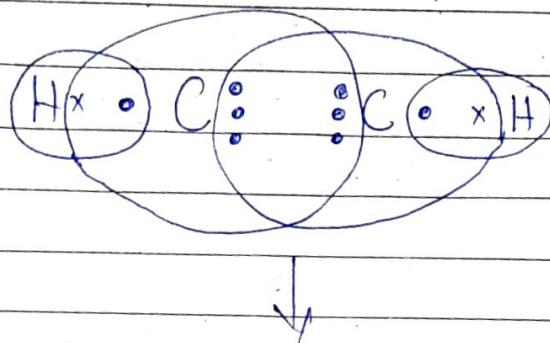


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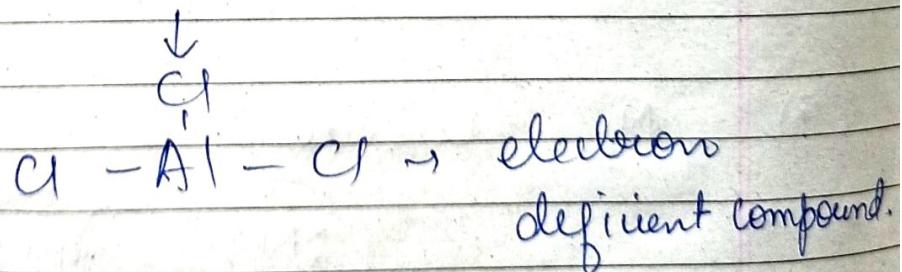
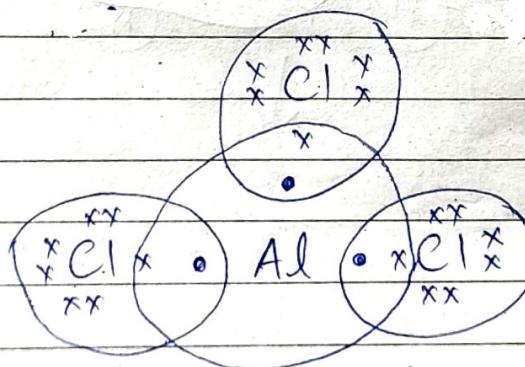
N_2 - Co-valent



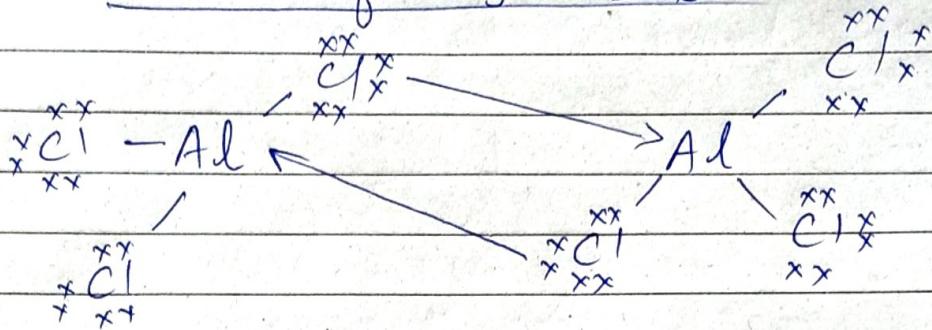
9) $C_2H_2 \rightarrow$ Co-valent Compound



10) $AlCl_3 \rightarrow$ Co-valent compound.



Dimer of $\text{AlCl}_3 \rightarrow \text{Al}_2\text{Cl}_6$



Duplet rule \Rightarrow The tendency of an atom like hydrogen, lithium, Beryllium to acquire two electrons in the outer most shell is called duplet rule.

Octet rule \Rightarrow The tendency of an atom to acquire eight electrons in the outer most shell is called octet rule.

Questions

- Q1. Differentiate between electrovalent and co-valent compounds
- Q2. Define \rightarrow electrovalency, co-valency, Octet rule, duplet rule
- Q3. Write down the Lewis dot structure of -
 - (i) CO_2
 - (ii) C_2H_4 ,
 - (iii) NaCl
 - (iv) N_2
 - (v) H_2O .