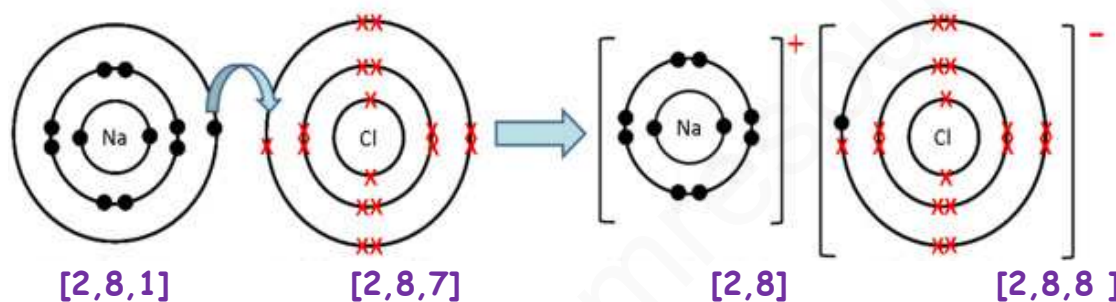


## Ions and ionic bonds

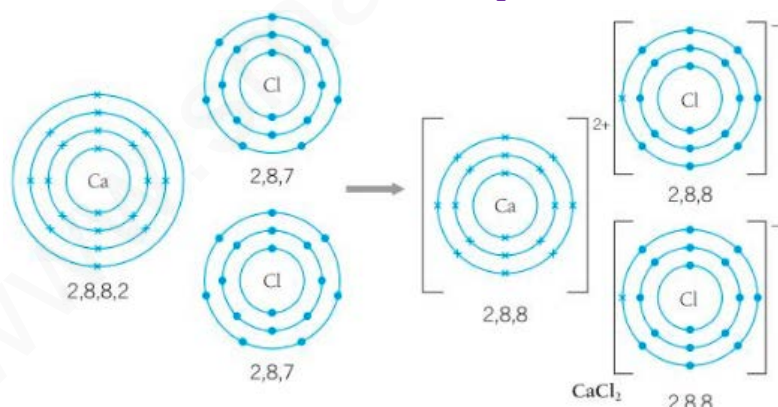
1. Ions are electrically charged particles formed by the loss of gain or electrons.
2. Anions(-vely charged) are negatively charged ions formed by gaining electrons.
3. Cations are positively charged ions formed by losing electrons.
4. The electrostatic attraction between the positive ions and the negative ions results in an ionic bond
5. Atoms lose or gain electrons to attain the stable electronic structure of the nearest inert element and become more stable.
6. When elements of group 1 an 7 react, the group 1 atom loses an electron and the group 7 gains it.

### Formation NaCl



In the formation of sodium chloride, sodium atom loses one electron and becomes a +vely charged cation. The chlorine atom accepts this electron and forms a negatively charged ion called the anion. Thus by doing so both the ions have a stable electronic structure which is the same as the noble gas. So a stable electronic structure has been formed.

### Formation of Calcium chloride $\text{CaCl}_2$



- The calcium atom has 2 electrons in the outer orbit.
- But each chlorine needs only one electron. to get a stable octet.
- So 2 chlorine atoms are needed in the reaction to bond with calcium.

## Ionic and covalent compounds- A comparison

|                                   | Covalent  | Ionic  |
|-----------------------------------|---|--|
| Formed between                    | Non -metals   | Metals and non-metals  |
| Melting points and boiling points | Low melting and boiling points because the intermolecular attractive forces are very weak.<br>Exceptions are: $\text{SiO}_2$ with a high melting point            | High melting and boiling points because of strong electrostatic forces between the ions in the giant lattice               |
| Solubility                        | Insoluble in water<br>( Exceptions: sugar and amino acids-water soluble)  | Soluble in water because the water molecules are able to separate the ions from one another and keep them in the solution. |
| Electrical conductivity           | Do not conduct electricity because they have no ions.<br>Hydrogen chloride gas, a covalent compound reacts with water to form HCl acid which splits up into ions. | They conduct electricity in the molten or aqueous form due to the presence of mobile ions.                                 |

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