10th CBSE Science

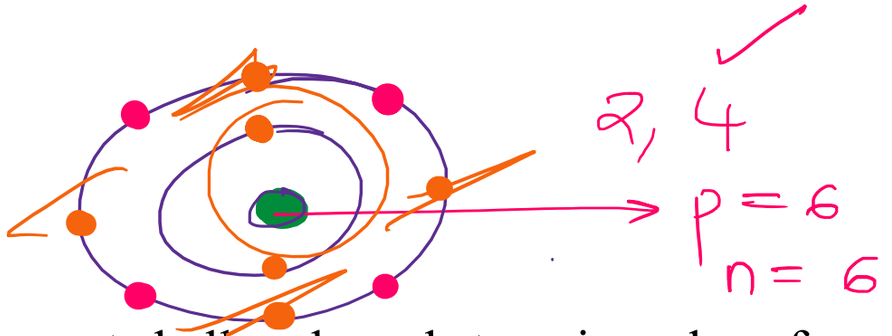
04. Carbon and Its Compounds

Lecture 1

C ⟶ 6

E·C ⟶ 2,4

Why does Carbon go for Covalent Bonding ? OR
Why doesn't carbon go for Ionic Bonding ? OR
Why does Carbon neither lose or gain electrons ?



In the case of carbon, it has four electrons in its outermost shell and needs to gain or lose four electrons to attain noble gas configuration. If it were to gain or lose electrons –

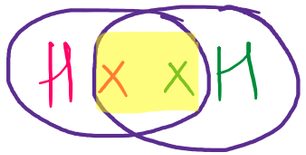
(i) It could gain four electrons forming C^{4-} anion. But it would be difficult for the nucleus with six protons to hold on to ten electrons, that is, four extra electrons.

(ii) It could lose four electrons forming C^{4+} cation. But it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding on to just two electrons.

- Carbon overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements.
- Not just carbon, but many other elements form molecules by sharing electrons in this manner.
- The shared electrons ‘belong’ to the outermost shells of both the atoms and lead to both atoms attaining the noble gas configuration.

H → 1

H x x H

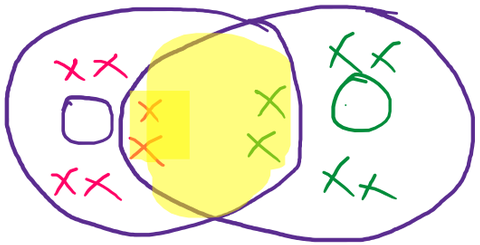


Covalent bond

mutual sharing of electrons

H — H single bond

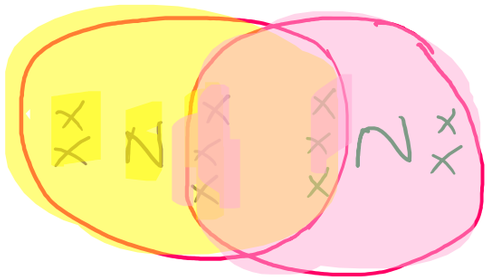
O → 2,6



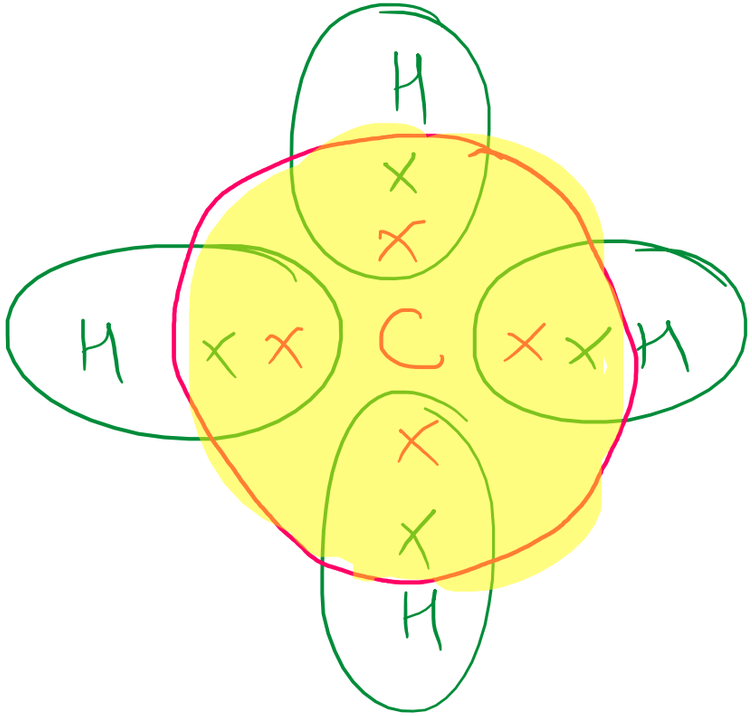
lone pair of electrons

double bond

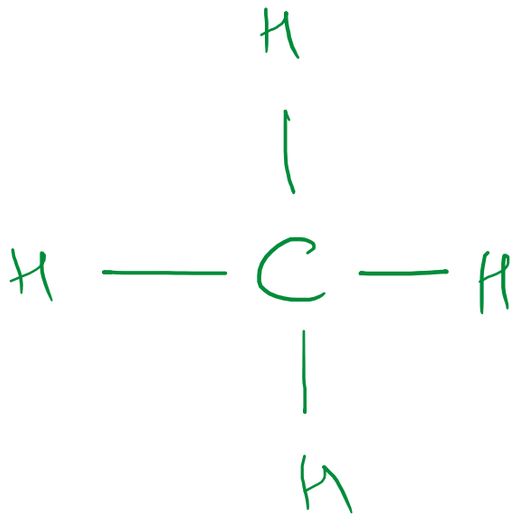
N → 2,5



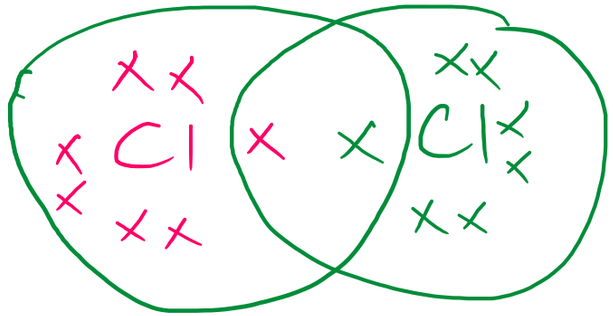
triple bond



× H



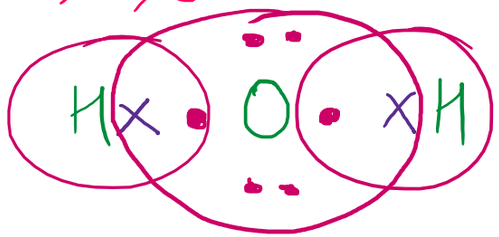
Cl ⟶ 2, 8, 7



Water (H_2O)

H ⟶ 1

O ⟶ 2, 6

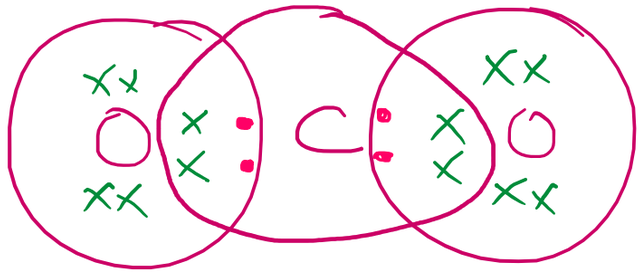


Electron dot structure ⟶

CO_2

C ⟶ 2, 4

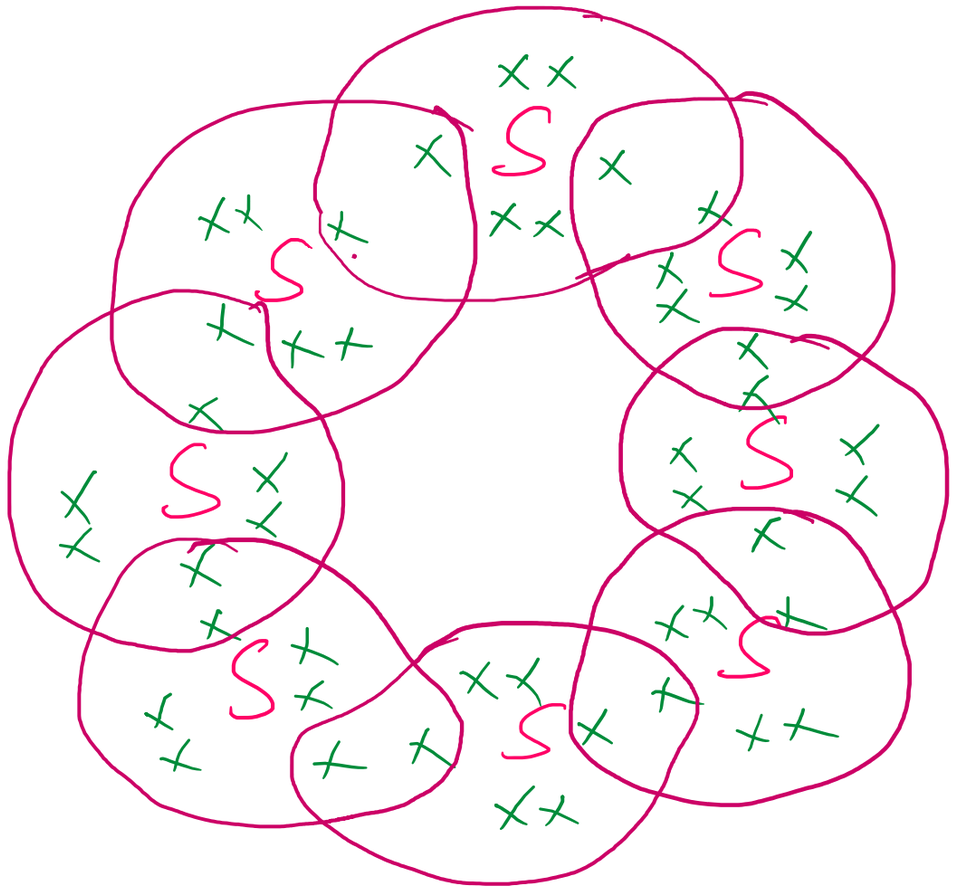
O ⟶ 2, 6



S_8

$S \longrightarrow 16$

$\in \cdot C \cdot \longrightarrow 2, 8, 16$



Covalent compounds does not conduct electricity due to lack of charged particles.