

## Covalent bonding

1. (c) 6

**Explanation:**

In sulphuric acid ( $\text{H}_2\text{SO}_4$ ):

- Each hydrogen atom has a valency of +1, total from hydrogen = +2
- Each oxygen atom has a valency of -2, total from oxygen = -8
- Let the valency (oxidation state) of sulphur be x

So,

$$x + 2(+1) + 4(-2) = 0$$

$$x + 2 - 8 = 0$$

$$x = +6$$

2. (c) In  $\text{N}_2$  molecule each Nitrogen atom contribute  $3e^-$  so total no. of electron's are 6.
3. (b) Non-metals readily form diatomic molecules by sharing of electrons. Element M ( $1s^2 2s^2 2p^5$ ) has seven electrons in its valence shell and thus needs one more electron to complete its octet. Therefore, two atoms share one electron each to form a diatomic molecule ( $M_2$ )
4. (b) Electrons are equally shared

**Explanation:**

In a **covalent bond**, atoms share **one or more pairs of electrons** between them so that each atom achieves a stable electronic configuration (usually the octet).

- In **ionic bonding**, electrons are **transferred**, not shared.
- In **covalent bonding**, the **shared pair(s) of electrons** belong equally to both atoms.



Hence, in covalency, **electrons are equally shared** between the atoms.

5. (d) Covalent character depend on the size of cation and anion.
6. (a) In graphite all carbon atoms are  $sp^2$ -hybridised and have covalent bond.
7. (c) Silica has tendency to form long chain covalent structure such as carbon so it has giant covalent structure.
8. (a) All have linear structure.  
 $O = C = O, Cl - Hg - Cl, HC \equiv CH$
9. (d) Similar atoms form covalent bond.
10. (a) Covalent bond forms when electronegativity difference of two atom is equal to 1.7 or less than 1.7
11. (b) Similar atoms form covalent bond.
12. (b) Water is a polar solvent while covalent compounds are non-polar so they usually insoluble in water.
13. (c)  $BCl_3$  is electron deficient compound because it has only '6' electrons after forming bond.
14. (b) Due to its small size and 2 electrons in s-orbital Be forms covalent compound.
15. (c) It shares electrons



**Explanation:**

Silicon has 4 valence electrons (electronic configuration: 2, 8, 4).

It neither easily gains nor loses 4 electrons because that would require a large amount of energy.

Therefore, silicon forms **covalent bonds by sharing electrons** with other atoms.

16. (a) Potential energy is lowered

**Explanation:**

When two hydrogen atoms approach each other to form a molecule ( $H_2$ ), the attractive forces between the nuclei and electrons cause a **decrease in potential energy**.

The system becomes **more stable**, and energy is **released**, not absorbed.

17. (a) Between identical atoms

**Explanation:**

Covalent character is highest when the **electronegativity difference** between atoms is **zero** or very small.

Hence, **identical atoms** (e.g., H–H, Cl–Cl, O–O) form **pure covalent bonds** with **maximum covalent character**.

18. (c)  $H_2O$  will formed by covalent bonding.

19. (a) Covalent

**Explanation:**

In **diamond**, each carbon atom is **covalently bonded** to four other carbon atoms in a **tetrahedral arrangement**.

This results in a **three-dimensional covalent network**, giving diamond its **hardness** and **high melting point**.



20. (c) CO

**Explanation:**

In **carbon monoxide (CO)**, carbon and oxygen share electrons through both **covalent and coordinate bonds**, resulting in **an incomplete octet** for one of the atoms during bonding.

Therefore, the **octet rule is not strictly followed** in CO.

