CHEMISTRY 9th (New Book)

CHAPTER NO 3 CHEMICAL BONDING

1.	Metallic Bond	2.	Oxygen
3.	Because water is a polar compound and there exists strong forces of attraction between its molecules.	4.	F-F
5.	Graphite	6.	H-O
7.	Rb	8.	NaCl
9.	NH_4Cl	10.	Ethylene

Q#2: Short Question Answer

i. What types of elements lose their outer electron easily and what type of elements gain electron easily?

(a) Elements that lose their outer electrons easily are metals, especially those in Group 1 (alkali metals) and Group 2 (alkaline earth metals). They have low ionization energy.

(b) Elements that gain electrons easily are non-metals, especially those in Group 16 and 17 (like oxygen, fluorine, chlorine). They have high electron affinity.

ii. Why do lower molecular mass covalent compounds exist as gases or low boiling liquids?

Reason:

Lower molecular mass covalent compounds exist as gases or low boiling liquids because:

- They have weak intermolecular forces (e.g., Van der Waals forces).
- These weak forces require less energy to overcome, resulting in low melting and boiling points.

iii. Give one example of an element which exists as a crystalline solid and it has covalent bonds between its atoms.

Crystalline Solid:

Diamond (an allotrope of carbon) is a crystalline solid where each carbon atom is covalently bonded to four other carbon atoms in a tetrahedral structure.

iv. Which property of metals makes them malleable and ductile?

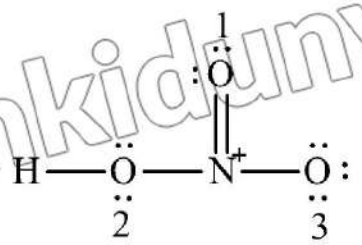
Property:

In metals, the atoms are strongly held and arranged in the form of rows one above the other. When pressure is applied on the metals, the upper rows of atoms slip pass the lower rows. As a result, their shapes are changed. Metals can, therefore be easily drawn into wires and sheets. This property makes them malleable and ductile.

v. Is coordinate covalent bond a strong bond?

Yes, a coordinate covalent bond (also called a dative bond) is generally as strong as a normal covalent bond once formed. It involves the sharing of a pair of electrons between two atoms.

vi. Write down dot and cross formula of HNO_3.



Q # 3: Constructed Response Questions

i. Why HF is a liquid while HCl is a gas?

Intermolecular Forces:

Hydrogen fluoride (HF) forms strong hydrogen bonds between its molecules due to the high electronegativity of fluorine. These intermolecular forces require more energy to break, so HF exists as a liquid at room temperature.

In contrast, hydrogen chloride (HCl) has dipole-dipole interactions and London dispersion forces, which are weaker than hydrogen bonds, so HCl exists as a gas under the same conditions.

ii. Why covalent compounds are generally not soluble in water?

Like Dissolves Like:

According to the principle of solubility (like dissolves like), non-polar compounds are insoluble in polar solvents. Covalent compounds (being a non-polar) are insoluble in water (polar), because they do not contain polar ends, water molecules cannot attract covalent compounds and remain insoluble in water.

iii. How do metals conduct heat?

Mobile Electrons:

Metals conduct heat due to the presence of freely moving electrons. These free electrons move easily. This property makes them good conductor of heat and electricity.

iv. How many oxides does nitrogen form. Write down the formula of oxides?

Nitrogen forms several oxides, including:

1. Nitrous oxide (N_2O)
2. Nitric oxide (NO)
3. Dinitrogen trioxide (N_2O_3)
4. Nitrogen dioxide (NO_2)
5. Dinitrogen tetroxide (N_2O_4)
6. Dinitrogen pentoxide (N_2O_5)

v. What will happen if NaBr is treated with $AgNO_3$ in water?

When sodium bromide (NaBr) is treated with silver nitrate ($AgNO_3$) in water, pale yellow precipitates of AgBr are formed.

$NaBr + AgNO_3 \rightarrow AgBr\downarrow + NaNO_3$

vi. Why does iodine exist as solid while Cl_2 exist as a gas?

Reason:

Iodine (I_2) exists as a solid because it has a large size and strong intermolecular forces between their molecules so it has high boiling point. Chlorine (Cl_2) exists as a gas because it has small size and weak intermolecular forces between their molecules so it has low boiling point.