

CHEMICAL BONDING

Level - 1.

Ans. 1. a. Ionic bond, because it is a bond formed between two oppositely charged ions. i.e. cations (metals) and anion (non-metal).

b. Covalent bond, this bond is formed by sharing electrons.

c. Co-ordinate bond, this is bond formed by sharing ~~elements~~ electrons only by one atom.

Ans. 2. a. H_2 - covalent bond

b. O_2 - Covalent bond

c. N_2 - Covalent bond

d. $NaCl$ - Ionic bond

Ans. 3. a. CH_4 - the bonds formed are covalent bonds

b. $NaOH$ - The bond formed is ionic bond

c. NH_4^+ - Co-ordinate & covalent bond

d. KCl - the bond formed is ionic bond

Ans. 4. a. Cation - after losing an electron the charge on an atom is positive. and cation is known as a positive ion.

- b. Anion - It is known as a negative ion.
- c. Electron - It consist of negative charge.
- d. Neutron - It is neutral in nature

Ans 5. a -1, after gaining an electron the charge gain due to electron is negative, as the electrons are negatively charge.

- ~~b. +1, after gaining electron it is negatively charge~~
- ~~c. +2, after gain it does not fill its valency.~~
- ~~d. -2, it gains only one electron to get its valence shell filled.~~

~~Ans 6. a. low melting & boiling points.~~

Ans 6. d. high melting and boiling points.

Ans 7. a. Na_2S - Ionic bond, it forms neutral compound

~~b. AlCl_3 - Covalent bond, bond formed by sharing electrons.~~

c. NaH - Ionic bond, transfer electrons from 1 atom to other

d. MgCl_2 - Ionic bond, bond forms between one positive & one negative atom

Ans 8. a. Ionic bond - bond between positive and negative atoms

~~b. Covalent bond - bond formed due to mutual sharing of electrons.~~

c Co-ordinate bond - bond formed when ~~only~~ only one atom shares electron

Ans 9. a) Oxidised - losing electron and becoming positively charge is oxidation. i.e atom gets oxidised.

Ans 10. a) Electrovalent / ionic compounds - they can conduct electricity in aqueous and molten states.

Ans 11. a) 3, - Triple bond is formed by ~~sharing~~ sharing of 3 electrons between two atoms.

Ans 12. b) PCl_5 - the bond formed here has 10 electrons instead of 8, so it shows expansion of octet rule.

Ans 13. b) Ionic bond - bond formed between positive & negative atoms / elements.

Ans 14. c) He - It has only one shell that hold two valence electrons. not more than that

Ans 15. b) double - It forms 2 covalent bond, 1 sigma & 1 pi bond and completes its octet state.

Ans 16. a) NaOH - bond between Na-O is an ionic bond and bond between O-H is a covalent bond.

Ans 17. a) energy is released - this energy is known as bond ~~energy~~ energy.

Ans 18. b) BeCl_2 - because they do not complete their octet

Ans 19. c) CaCl_2 - Ionic bond as here the bond formed is between 1 positive and 1 negative atom

Ans 20. a) H_2O - Covalent bond as here the bond formed is by mutual sharing of electrons

Level - 2

Ans 1. d) In the formation of Mg^+ - the valency of Mg has 2 electrons and after giving

Ans 1. d) In the formation of Mg^+ - The valence shell of Mg has 2 electron and after giving / losing these electrons, the Mg^{+2} becomes octet.

Ans 2. H_2O - In water molecule the oxygen that bonds with hydrogen atoms has the lone pairs of electrons.

Ans 3. a) $\text{H}^+ + \text{H}_2\text{O}$ - In co-ordinate bond, the bond formed is when only one atom contributes in sharing electrons.

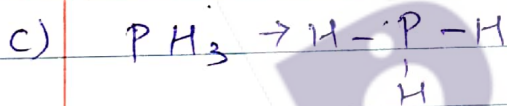
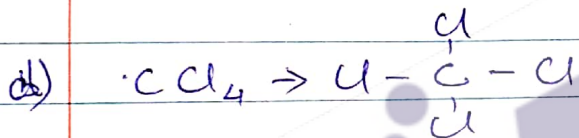
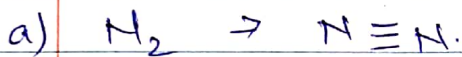
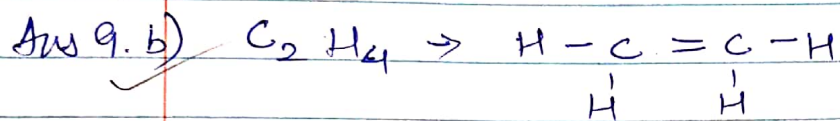
Ans 4. c) oppositely charged ions - Ionic bond is formed between opposite charged atoms where one gains and other one loses electrons to form bond.

Ans 5. b) 5 and 6 - As the valency of A is 2,
 $N_1 = 8 - \text{valency}$. i.e $N_1 = 8 - 2 = 6$.
By using formula $C_1 \times N_1 = C_2 \times N_2$
 $A \times 6 = B \times 5$ i.e $A/5 = B/6$
 $\therefore A = 5$ and $B = 6$.

Ans 6. c) similar and dissimilar atoms - covalent bond is formed between any two atoms which mutually share electrons.

Ans 7. b) to attain an inert gas configuration - as they want to be stable and attain octet.

Ans 8. c) Unequal sharing of electrons - because in co-ordinate bond the electrons are shared by only one atom.



Ans 10. a) $Mg - ([Ne] 3s^2)$ so after losing the valence shell 2 electrons the element Mg will attain the electronic configuration of Neon.

c) $Ca - ([Ar] 4s^2)$ so after losing the valence shell 2 electrons the element Ca will attain the electronic configuration of Argon.

Ans 11 c) NH_4^+ - The bond between them is co-ordinate as here only one atom contributes to form bond by sharing electrons.

- a) NaCl - The bond formed here is ionic bond as the bond formed here is due to ~~the~~ losing & gaining electrons
- b) Cl_2 - The bond formed is covalent as the bond is formed by mutually shared electrons.
- d) NH_3 -

Ans 12. a) Covalent, HF - The bond formed is covalent because they mutually share electron and form bond., both need only 1 electron to ~~complete~~ be stable.

Ans 13. b) Ionic, CaO - The bond formed is ionic because they lose & gain electrons to complete their octet, both need to lose Ca 2 electrons and gain O 2 electrons to complete octet and be stable.

Ans 14. a) Inert gases - As these are stable and outer shell is filled.

Ans 15 a) $\text{N}_2 \rightarrow \text{N} \equiv \text{N}$, valency is 3

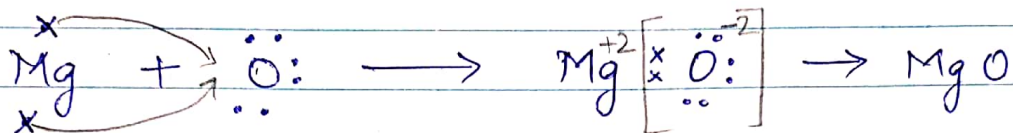
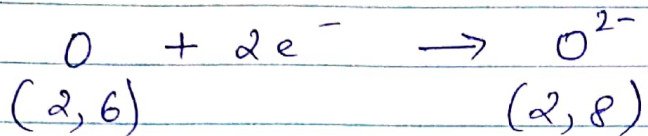
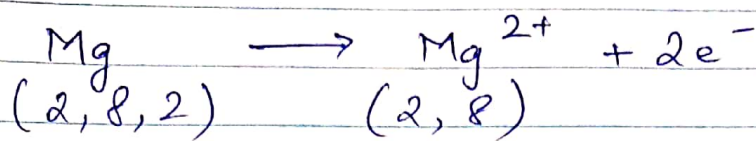
b) $\text{O}_2 \rightarrow \text{O} = \text{O}$, valency is 2

c) $\text{H}_2 \rightarrow \text{H} - \text{H}$, valency is 1.

* Subjective Questions

1. Noble gases do not have valence electrons in their outermost shell. So they cannot form bonds and are stable.

2. Formation of Magnesium oxide MgO .



3. i) Magnesium and Chloride in $MgCl_2$ -

- The bond between $MgCl_2$ is an ionic bond which has two oppositely charged atoms i.e. Mg as cation & Cl as anion. A bond between a metal and non-metal; where Mg gives/loses its valence 2 electrons and Cl gains those electrons and both become stable.

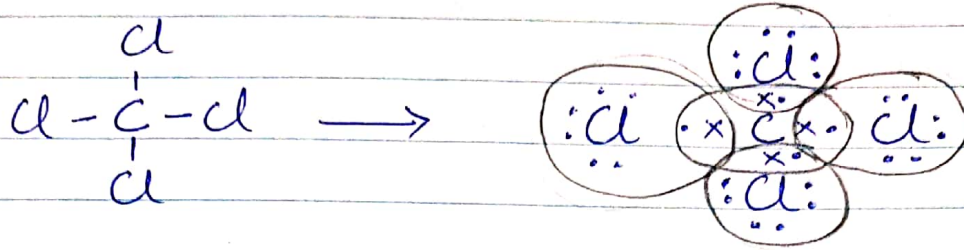
ii) 2H atoms in H_2 -

- The bond between H_2 is covalent bond where both atoms of hydrogen mutually share electrons and the molecule becomes stable.

4. Covalent compounds are generally liquids/gases because they have very weak forces of attraction i.e. weak intermolecular forces that hold the atoms together and they also have low boiling points.

5. Carbon Tetrachloride :- CCl_4

- Carbon Tetrachloride is covalently bonded compound which has one carbon atom and four chlorine atoms. They share bonding electrons to become stable.



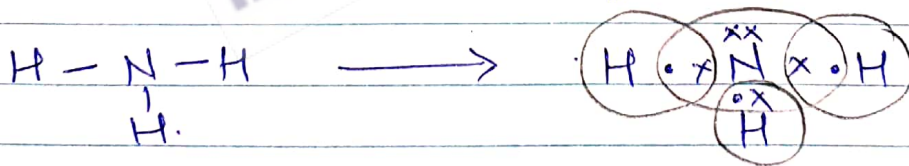
II Water H_2O :-

- Water is covalently bonded compound which has one oxygen and two hydrogen atoms. They share electrons and form bond to be stable.



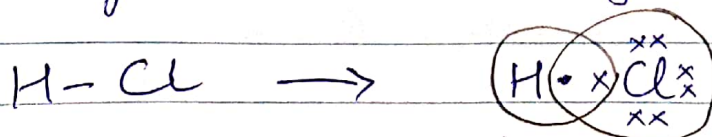
III Ammonia NH_3 :-

- Ammonia is covalently bonded compound which has one nitrogen atom and three hydrogen atoms. They share electrons mutually to gain stability.



IV Hydrogen Chloride HCl :-

- Hydrogen Chloride is covalently bonded compound which has one hydrogen atom & one chlorine atom. They mutually share electrons for being stable.

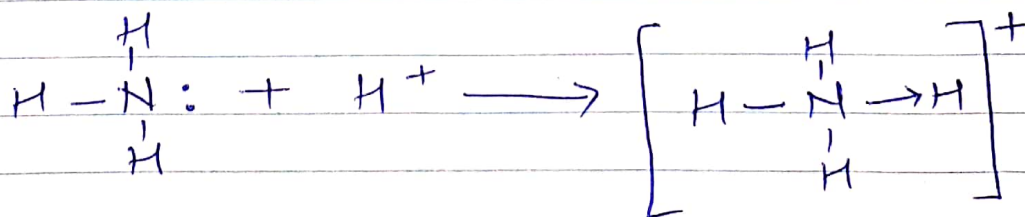


6. Argon (18) has the electronic configuration of (2, 8, 8) that means there is no net charge i.e. Argon atom is neutral. Now Chlorine (17) is neutral with electronic configuration of (2, 8, 7) that shows it needs one electron to be stable and complete octet like Argon. But when Chlorine gains electrons it becomes chloride ion i.e. Cl^- . This shows that the atom has completed octet like Argon but the number of protons is not equal to electrons. Hence chloride ion is not as same as Argon.

7.1 Electrovalent bond:- The chemical bond formed between two or more atoms due to transfer of one or more electrons between them. When an atom loses an electron and undergoes oxidation and other atom gains an electron to get reduced. This kind of bond is called electrovalent or ionic bond.

11. Covalent bond:- A chemical bond formed between two or more atoms by mutually sharing electrons to get nearest noble gas configuration.

8. Ammonium ion is a positively charged ion having one nitrogen and four hydrogen NH_4^+ . It is formed when a hydrogen atom gets attached to ammonia i.e. protonation of ammonia. (NH_3)



9. Ionic bond

- A chemical bond formed between two or more atoms due to transfer of one or more electrons between them. When one atom loses electron to get oxidize & other one gains electrons to get reduce.

Covalent bond.

A chemical bond formed between two or more atoms by mutually sharing electrons and attain the nearest noble gas configuration.

10. Bond between Magnesium and Oxygen is an ionic bond. which forms \rightarrow MgO. Magnesium oxide

