



gain two more electrons and therefore remains electron deficient.

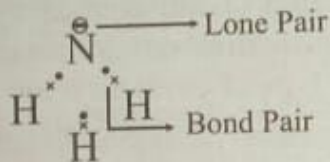
Q76. What type of electron pairs make a molecule good donor? 09204094

Ans. Lone pair of electrons make a molecule, a good donor. Since, they are not involved in bonding, so they can be used to form further bonds e.g. In ammonia, there is one lone pair on nitrogen which forms a coordinate covalent bond with another hydrogen ion forming ammonium ion.

Q77. What is the difference between bonded and lone pair of electron and how many bonded pair of electrons are present in NH₃ molecule? 09204095

Ans. Bond Pair: Valence shell electron pair involved in chemical bonding is a bond pair.

Lone Pair: The electron pair which does not involve in bonding is the lone pair of electrons and can form further bonds in certain cases.



e.g. Three pairs of bonded electrons are present in NH₃ as there are three single covalent bonds in ammonia molecule between one nitrogen and three hydrogen atoms.

Q78. What do you mean by delta sign and why it develops? 09204096

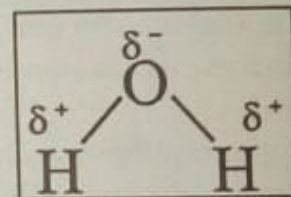
Ans. The delta (δ) sign indicates partial positive or partial negative charge that is developed due to unequal sharing of shared pair or bonded pair of electrons.

Q79. Why does oxygen molecule not form a polar covalent bond? 09204097

Ans. In oxygen molecule (O₂) two oxygen atoms are covalently bonded to each other. As the atoms are similar, the electronegativity difference is zero, and the electron pairs are equally shared between them. Hence, there is no polarity in the bond.

Q80. Why has water polar covalent bonds? 09204098

Ans. Oxygen is a highly electronegative atom as compared to hydrogen. So, during the mutual sharing, the electron pair is attracted more towards oxygen and it acquires a partial negative charge and a partial positive charge develops on hydrogen. Hence, poles are created and the covalent bond becomes polar. e.g.



Test yourself 4.3

Q81. What type of elements form metallic bonds? 09204099

Ans. Metallic bonds consist of sea of mobile electrons with positive metal ions. They are present in elements which have loosely bound electrons that do not remain in the valence shell and leave the atom to form a sea of electrons. Such a structure is observed usually in metals e.g., sodium, and iron.

Q82. Why is the hold of nucleus over the outermost electrons in metals weak? 09204100

Ans. The hold of nucleus on the outermost electrons in metals is very weak because of the increased screening effect or shielding effect due to the intervening electrons which tend to decrease the force of attraction between nucleus and the electrons. Distance also plays

the same role. As the electrons are at a greater distance from nucleus, the force of attraction on valence electron becomes weak.

Q83. Why do the electrons move freely in metals? 09204101

Ans. The hold of nucleus over the outermost electrons is weak because of large size and greater number of shells in between the nucleus and valence electrons. Furthermore, because of low ionization potentials, metals have the tendency to lose their outer electrons easily. Resultantly, these loose or free electrons of all metal atoms move freely in free space between atoms of a metal.

solvents like benzene, petrol etc.	solvents like benzene, petrol etc.
iii. They can conduct electricity in the form of aqueous solution.	iii. They do not conduct electricity.
Examples: HCl, HF	Examples: CH ₄ , C ₂ H ₂

Q62. What type of attractive forces exist in ionic compounds?

Ans. Ionic or electrostatic forces of attraction exist in ionic compounds.

Test yourself 4.1

Q63. Why does sodium form a chemical bond with chlorine? (Board 2014) 09204081

Ans. Sodium forms a chemical bond with chlorine due to the following reasons:

- Sodium is an electropositive element which can lose an electron from its outermost shell and chlorine is an electronegative element which has the tendency to gain one electron.
- Sodium needs to lose one electron to complete its octet while chlorine needs one more electron in its outermost shell to complete its octet and become stable.

So transference of electron from sodium to chlorine results in the formation of an ionic bond.

Q64. Why does sodium lose an electron and attains (+1) charge? 09204082

Ans. Sodium has the electronic configuration as follows: ${}_{11}\text{Na} = 1s^2, 2s^2, 2p^6, 3s^1$

Hence, it is better and easier for sodium to lose one electron and complete its valence shell rather than gaining seven electrons to complete the octet. Moreover it is electropositive in nature so it has tendency to lose an electron.

Q65. How do atoms follow octet rule?

(Board 2014)

09204083

Ans. Most of the atoms or elements in the periodic table gain stability by having eight electrons in their valence shell. They do so by gaining, sharing or losing electrons. This is



how they follow octet rule. They attain the electronic configuration of nearest noble gas.

Q66. Which electrons are involved in chemical bonding? 09204084

Ans. Only the electrons present in the valence shell of an atom are involved in chemical bonding. While the inner shell electrons do not take part in chemical bonding.

Q67. Why does group 1 elements prefer to combine with group 17 elements? 09204085

Ans. Group 1 elements are electropositive so they can readily lose electrons and have low ionization energies. Group 17 elements are

electronegative and have high electron affinities so they can readily accept an electron. Therefore, these parameters favor the formation of a strong ionic bond between group 1 and group 17 elements.

Q68. Why can chlorine accept only one electron? (Board 2014) 09204086

Ans. Chlorine has seven electrons in its valence shell. It needs one more electron to complete its outer most shell to gain the electronic configuration of a noble gas (Argon) that is why it accepts only one electron.

Test yourself 4.2

Q69. Give the electronic configuration of carbon atom. 09204087

Ans. ${}_6\text{C} = 1s^2, 2s^2, 2p^2$

Q70. What type of elements have tendency of sharing of electrons? 09204088

Ans. The non-metallic elements show tendency of sharing electrons between them.

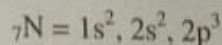
Q71. If repulsive forces dominate to attractive forces, will a covalent bond form? 09204089

Ans. When the repulsive forces dominate the attractive forces, a bond will not be formed. This is due to the fact that repulsive forces account for increase in energy. Bond is formed when the atoms are at a state of minimum

energy. As repulsive force will increase energy, so a covalent bond will not be formed.

Q72. Considering the electronic configuration of nitrogen atom, how many electrons are involved in bond formation and what type of covalent bond is formed? 09204090

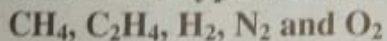
Ans. The electronic configuration of nitrogen is



The valence shell of nitrogen is deficient of three electrons. Thus two nitrogen atoms share their three valence electrons each to form a triple covalent bond with three pairs of electrons and six electrons as a total are

shared. i.e., $\left(\overset{\cdot\cdot}{\text{N}} \equiv \overset{\cdot\cdot}{\text{N}} \right)$

Q73. Point out the type of covalent bonds in the following molecules: 09204091



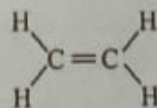
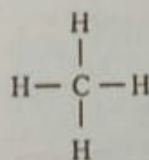
Ans.

- CH_4 has Single covalent bond
- C_2H_4 has Double covalent bond
- H_2 has Single covalent bond
- N_2 has Triple covalent bond
- O_2 has Double covalent bond

Q74. What is lone pair? How many lone pair of electrons are present on nitrogen in ammonia? (Board 2013) 09204092

Ans. The non-bonded electron pair available on an atom in a molecule is called lone pair of electrons.

In ammonia ($\overset{\cdot\cdot}{\text{N}}\text{H}_3$), there is only one lone pair present on nitrogen atom.



Q75. Why is the BF_3 electron deficient? 09204093

Ans. Boron has the electronic configuration as $1s^2 2s^2 2p^1$. This means that it needs five more electrons to be stabilized. In BF_3 it shares three electrons are each with three fluorine atoms and thus attains six electrons in its valence shell. It still retains the tendency to

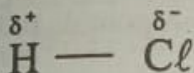


Q84. Which types of electrons are responsible for holding the atoms together in metals? 09204102

Ans. The mobile or free electrons are responsible for holding the atoms of metals together forming a metallic bond.

Q85. Why does a dipole develop in a molecule? 09204103

Ans. The unequal sharing of electrons between two different types of atoms make one end of molecule slightly positive and other end slightly negatively charged. Hence a dipole develops in a molecule. e.g.



Q86. What do you mean by induced dipole? 09204104

Q89. Define intermolecular forces: show these forces among HCl molecule. 09204107

Ans. A weak force of attraction formed between two molecules is called intermolecular force.

e.g: i) Dipole Dipole

ii) Hydrogen Bonding

Test yourself 4.4

Q90. Why do the ionic compounds have high melting and boiling points? 09204108

Ans. As ionic compounds are made up of positive and negative ions, there exist strong electrostatic forces of attraction between oppositely charged ions. So, a great amount of energy is required to break these forces, therefore ionic compounds have high melting and boiling points.

Q91. What do you mean by malleability? 09204109

Ans. Malleability is the property by virtue of which a metal can be drawn into sheets.

Q92. Why are ionic compounds easily soluble in water? 09204110

Ans. Water has high dielectric constant that weakens the attraction between the ions of

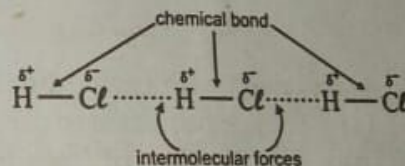
Ans. The positive end of polar molecule attracts the mobile electrons of the nearby non-polar molecule. In this way polarity is introduced in non-polar molecules and both become dipoles. These forces are called dipole induced forces.

Q87. Why are dipole forces of attraction not found in halogen molecules? 09204105

Ans. Halogen molecules form a non-polar covalent bond between them. In order to make non-polar bonds, no electronegativity difference of elements is required, due to which dipole forces do not develop in halogen molecules.

Q88. What types of attractive forces exist between HCl molecules? 09204106

Ans. Weak intermolecular forces exist between HCl molecules. i.e. Dipole - Dipole forces between HCl molecule.



ionic compounds due to which they are easily soluble in water.

Q93. What type of bond exists in sodium chloride? 09204111

Ans. Sodium chloride is an ionic compound, therefore, ionic bond is present in sodium chloride.

Q94. Why do the covalent compounds of bigger size molecules have high melting points? 09204112

Ans. Bigger sized molecules with three dimensional bonding forms covalent crystals which are very stable and hard due to which they have high melting and boiling points.