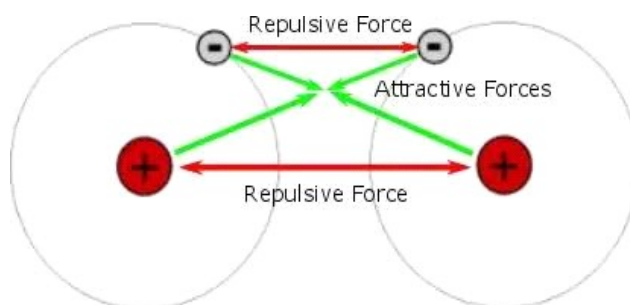


(iii) Energy concept

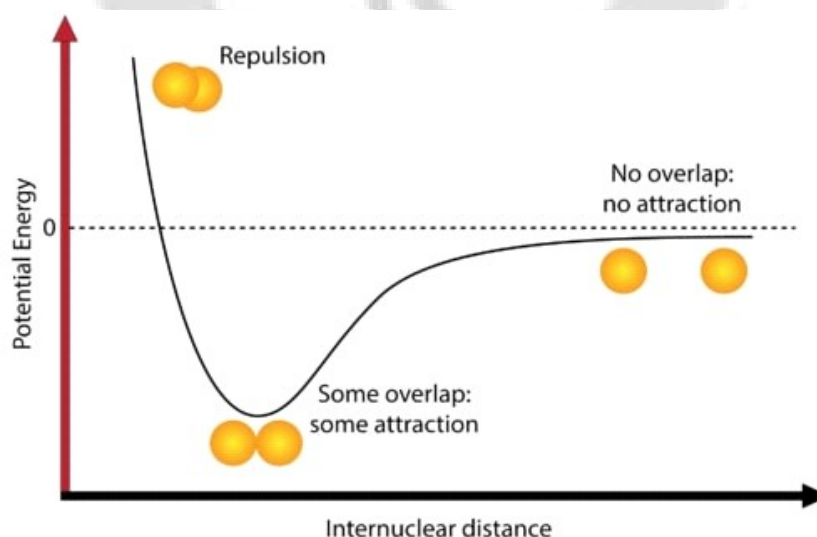
- (a) Atoms combine with each other to minimize their energy.
 (b) Let us take the example of hydrogen molecule in which the bond between two hydrogen atoms is quite strong.
 (c) During the formation of hydrogen molecule, when two hydrogen atoms approach each other, two types of interaction become operative as shown in figure.



The force of attraction between the molecules of one atom and electrons of the other atom. The force of repulsion between the nuclei of reacting atoms and electrons of the reacting atoms

(d) As the two hydrogen atoms approach each other from the infinite distance, they start interacting with each other *when the magnitude of attractive forces is more than that of repulsive forces a bond is developed between two atoms.*

(e) The decrease in potential energy taking place during formation of hydrogen molecule may be shown graphically



(f) The inter nuclear distance at the point O have minimum energy or maximum stability is called bond length.

(g) The amount of energy released (i.e., decrease in potential energy) is known as enthalpy of formation.

(h) From the curve it is apparent that greater the decrease in potential energy, stronger will be the bond formed and vice versa.

(i) It is to be noted that for dissociation of hydrogen molecule into atoms, equivalent amount of energy is to be supplied.

(j) Obviously in general, a stronger bond will require greater amount of energy for the separation of atoms. The energy required to cleave one mole of bonds of the same kind is known as the bond energy or bond dissociation energy.

This is also called as orbital overlap concept of covalent bond.

(2) Overlapping

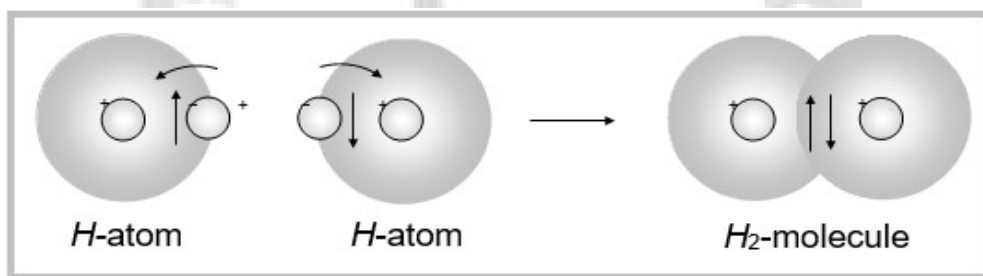
(i) According to this concept a covalent bond is formed by the partial overlapping of two half filled atomic orbitals containing one electron each with opposite spins then they merge to form a new orbital known as **molecular orbital**.

(ii) These two electrons have greater probability of their presence in the region of overlap and thus get stabilised i.e., during overlapping energy is released.

Examples of overlapping are given below :

Formation of hydrogen molecule :

Two hydrogen atoms having electrons with opposite spins come close to each other, their s-orbitals overlap with each other resulting in the union of two atoms to form a molecule.



Formation of fluorine molecule :

In the formation of F_2 molecule p -orbitals of each fluorine atom having electrons with opposite spins come close to each other, overlapping take place resulting in the union of two atoms.

