CBSE TEST PAPER-05

CLASS - XI CHEMISTRY (Chemical Bonding and Molecular Structure)

General Instruction:

- All questions are compulsory.
- Marks are given alongwith their questions.

1. What is sigma bond? [1]

2. What is pi – bond? [1]

3. Why is s– bond stronger than π - bond? [2]

4. How many s and π bond are there in a molecule of C_2H_4 (ethene)? [1]

5. How many s and π bonds are there in a molecule of $CH_2 = CH – CH = CH_2$? [1]

6. What type of bond exists in multiple bond (double / triple)? [1]

7. What are the different types of s - bond formation? [2]

8. What type of bond are formed due to orbital overlap? [1]

9. How do covalent bonds form due to orbital overlapping? [1]

10. What is zero overlap? [2]

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ANSWERS]

Ans1. A covalent bond formed due to the overlap of orbitals of the two atoms along the line going the two nuclei (orbital axis) is called sigma (s) bond.

Ans2. A covalent bond formed between the two atoms due to the sideways overlap of their p – orbitals is called a pi (π) bond.

Ans3. Orbitals can overlap to a greater extent in a s - bond due to axial orientation, so s - bond is strong. Whereas, in a pi – bond sideways overlapping is not to an appreciable extent due to the presence of s - bond which restricts the distance between the involved atoms.

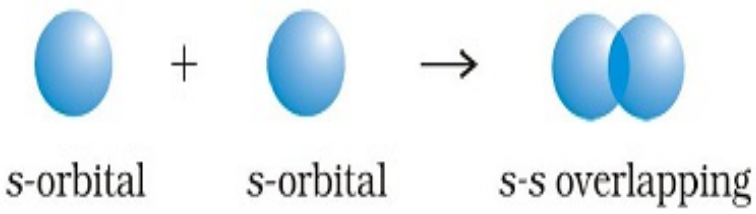
Ans4. In a molecule of ethene, there are 5 s - bonds (one between C-C , and four between C-H and one π - bond.

Ans5. There are 9 s - bonds (three between C – C and 6 between C – H) and 2 π - bonds.

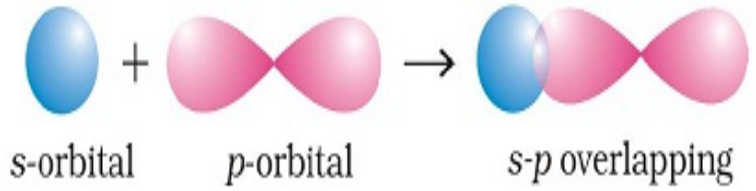
Ans6. pi (p) – bond is always present in molecules containing multiple bond.

Ans7. s - bond can be formed by any of the following types of combinations of atoms orbitals.

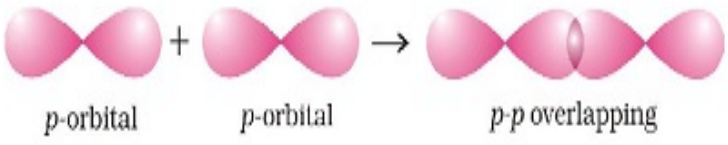
(a) S – S – overlapping : In this case, there is a overlap of two half – filled S – orbitals along the inter nuclear axis.



(b) S- P overlapping : This type of over lapping occurs between half – filled s-orbitals of one atom and half-filled p-orbitals of another atom.



(c) P – P overlapping : This type of overlap takes place between half-filled p-orbitals of the two approaching atoms.



Ans8. Covalent bonds are formed due to the overlap of certain orbitals that are oriented favourably in the space.

Ans9. According to orbital overlap concept, the formation of a covalent bond between two atoms results by pairing of electrons present in the valence shell having opposite spins.

Ans10. The unsymmetrical overlap of orbitals results in zero overlap i-e; between p_x-s and p_x-p_y orbital

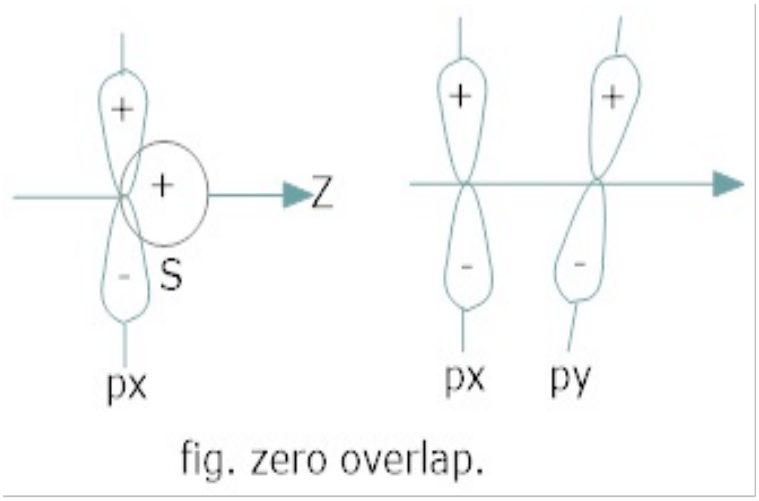


fig. zero overlap.