

Most Repeated Questions in JEE Main Chemistry from Molecular Orbital Theory

Q: Which of the following linear combination of atomic orbitals will lead to formation of molecular orbitals in homonuclear diatomic molecules [internuclear axis in z-direction] ?

- A. 2pz and 2px
- B. 2s and 2px
- C. 3dxy and $3dx^2-y^2$
- D. 2s and 2pz
- E. 2pz and $3dx^2-y^2$

Choose the correct answer from the options given below:

- (a) D only
- (c) C and D only
- (b) E only
- (d) A and B only

Q: Total number of molecules/species from following which will be paramagnetic is _____.
 O_2 , O_2^+ , O_2^- , NO, NO_2 , CO, $K_2[NiCl_4]$, $[Co(NH_3)_6]Cl_3$, $K_2[Ni(CN)_4]$

Q: Statement (I): A π bonding MO has lower electron density above and below the internuclear axis.

Statement (II): The π^* antibonding MO has a node between the nuclei.

- (A) Both Statement I and Statement II are true
- (B) Both Statement I and Statement II are false
- (C) Statement I is true but Statement II is false
- (D) Statement I is false but Statement II is true

Q: Total number of electrons present in (π^*) molecular orbitals of O_2 , O_2^+ and O_2^- is _____.

Q: Number of molecules having bond order 2 from the following molecules is _____. C_2 , O_2 , Be_2 , Li_2 , Ne_2 , N_2 , He_2

Q: Number of σ and π bonds present in ethylene molecule is respectively:

Q: The linear combination of atomic orbitals to form molecular orbitals takes place only when the combining atomic orbitals

- A. have the same energy
- B. have the minimum overlap
- C. have same symmetry about the molecular axis
- D. have different symmetry about the molecular axis

- (A) B, C, D only
- (B) A, B, C only
- (C) B and D only
- (D) A and C only

Q: What is the number of unpaired electrons(s) in the highest occupied molecular orbital of the following species: N_2 ; N_2^+ ; O_2 ; O_2^+ ?

- (A) 0, 1, 2, 1
- (B) 2, 1, 2, 1
- (C) 0, 1, 0, 1
- (D) 2, 1, 0, 1

Q: According to MO theory the bond orders for O_2^{2-} , CO and N_2^+ respectively are

- (A) 1, 3, and 3
- (B) 1, 3, and 2
- (C) 1, 2, and 3
- (D) 2, 3 and 3