

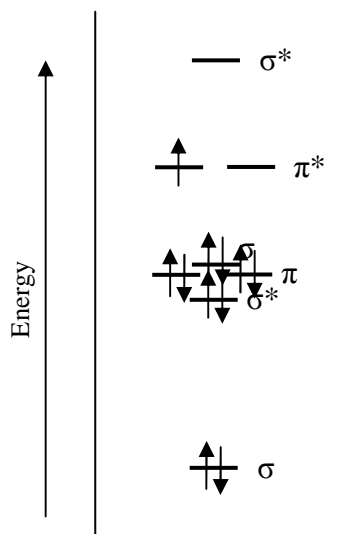
- The NO molecule plays an important signalling role in the human body.

Marks
5

How many valence electrons are in the molecule NO?

11 (5 from N, 6 from O)

The molecular orbital energy level diagram provided shows the energies of the orbitals for the valence electrons in the NO molecule. Indicate on this diagram the ground state electronic configuration of NO using the arrow notation for electron spins.



Calculate the bond order of NO.

Bond order = $\frac{1}{2} (8 - 3) = 2.5$

Is the NO molecule diamagnetic or paramagnetic? Explain your answer.

NO contains an unpaired electron so it is paramagnetic.

Would removing an electron from NO to form NO⁺ strengthen or weaken the bond between the two atoms? Explain your answer.

The highest energy electron in NO is in the π^* (antibonding) level. Removal of this electron to form NO⁺ increases the bond order to:

$$\text{bond order} = \frac{1}{2} (8 - 2) = 3$$

The higher bond order signifies a stronger bond.