Marks 5

- The electronic configuration of the molecular oxygen dianion in its ground state is, in order (from left to right) of increasing energy: $\sigma^2\ \sigma^{*2}\ \sigma^2\ \sigma^{*2}\ \sigma^2\ \pi^4\ \pi^{*4}$

What is the bond order of O_2^{2-}?

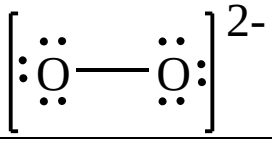
½ (8 – 6) = 1
(σ^2, σ^2 and π^4 are bonding, π^{*4} are antibonding)

Is O_2^{2-} paramagnetic or diamagnetic? Explain your answer.

All of the spins are paired as every orbital is full. It is therefore diamagnetic.

How many of the valence electrons in O_2^{2-} are in 'lone pairs' according to Lewis theory?

The Lewis structure gives 3 lone pairs on each oxygen atom so 12 electrons are in lone pairs in total.



On the electron configuration of O_2^{2-} below, indicate by arrows the molecular orbitals that contain the electron 'lone pairs'.