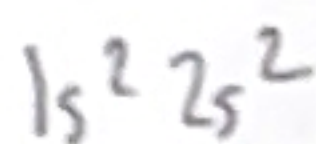


Key

Ch.9 Molecular Orbital Theory

Draw the energy-level diagrams for following molecules, determine the bond order of the covalent bond in each. Determine whether the molecule is paramagnetic or diamagnetic

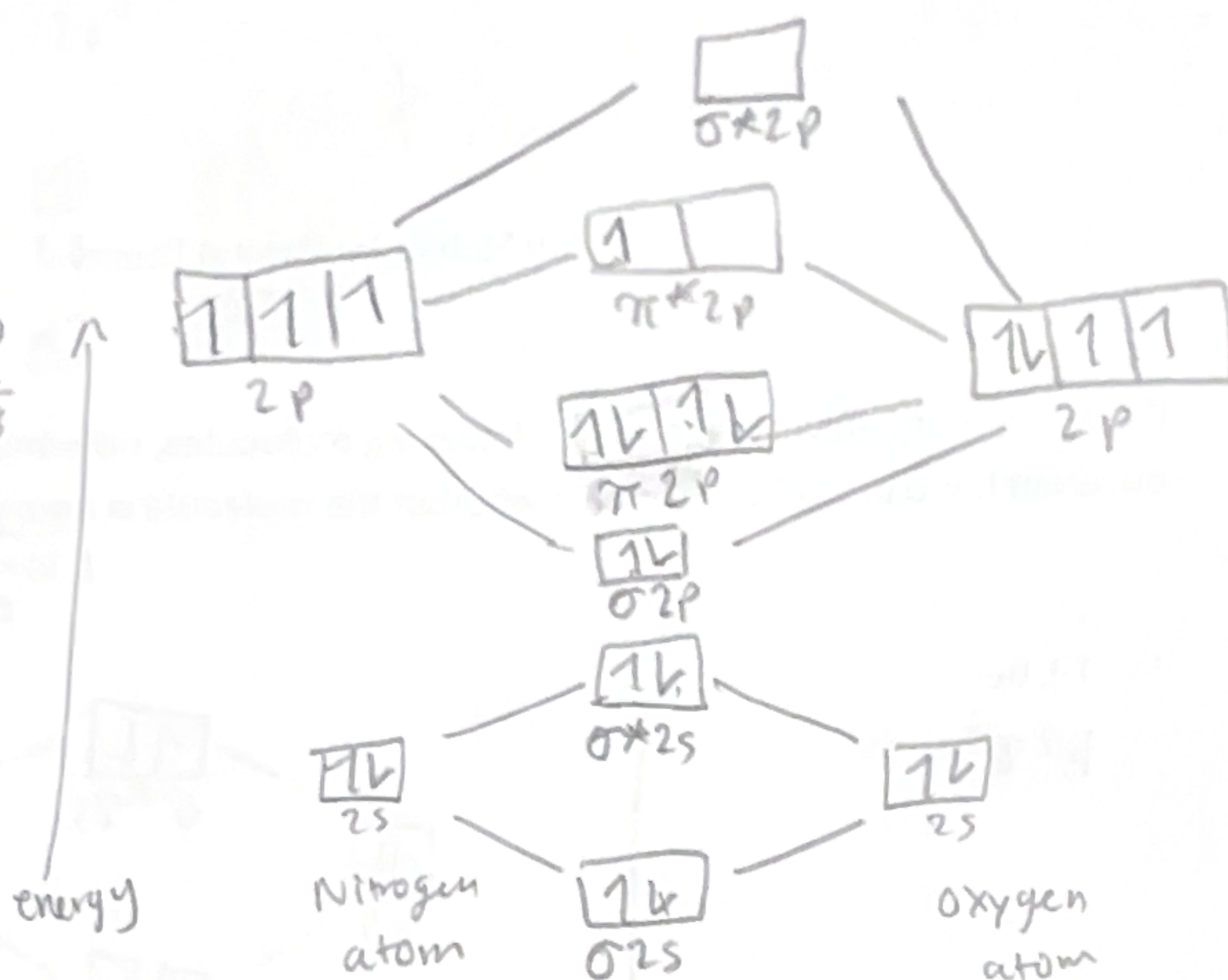
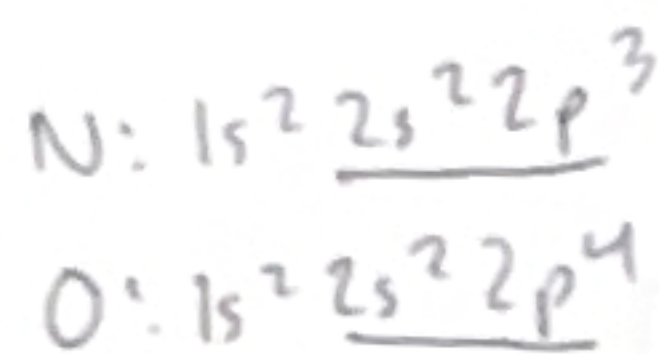
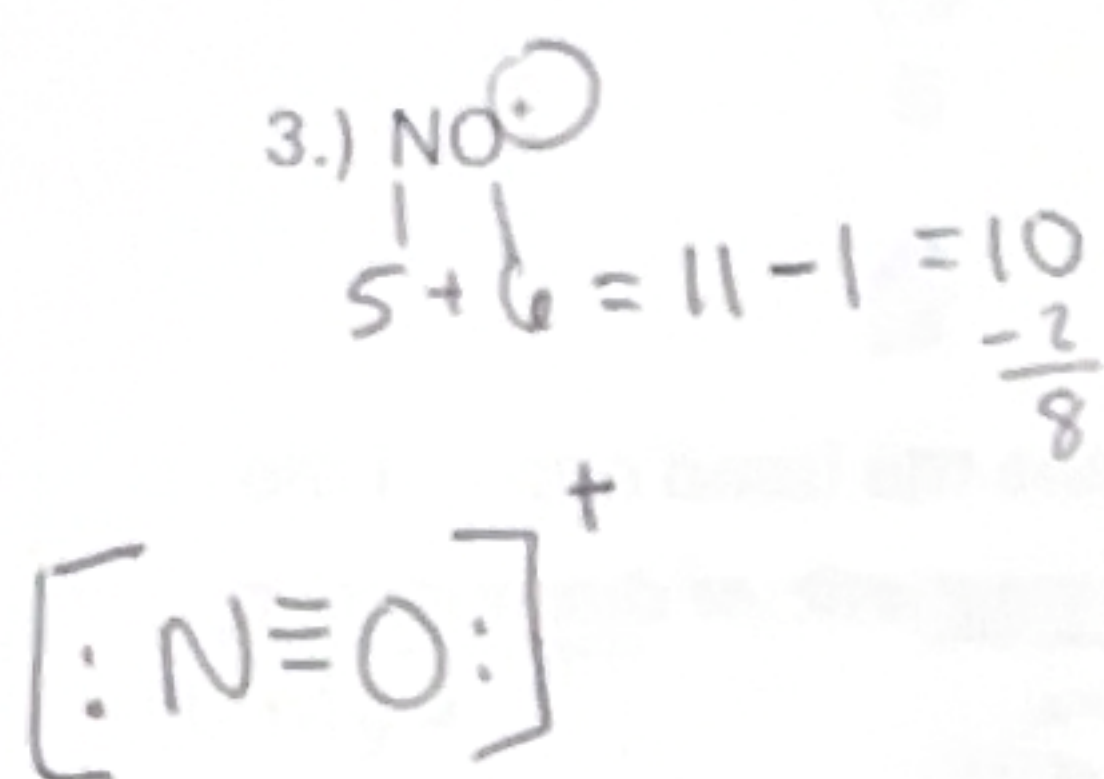
1.) Be₂



Bond order: $\frac{2-2}{2} = 0$ diamagnetic

~~2.) CO~~

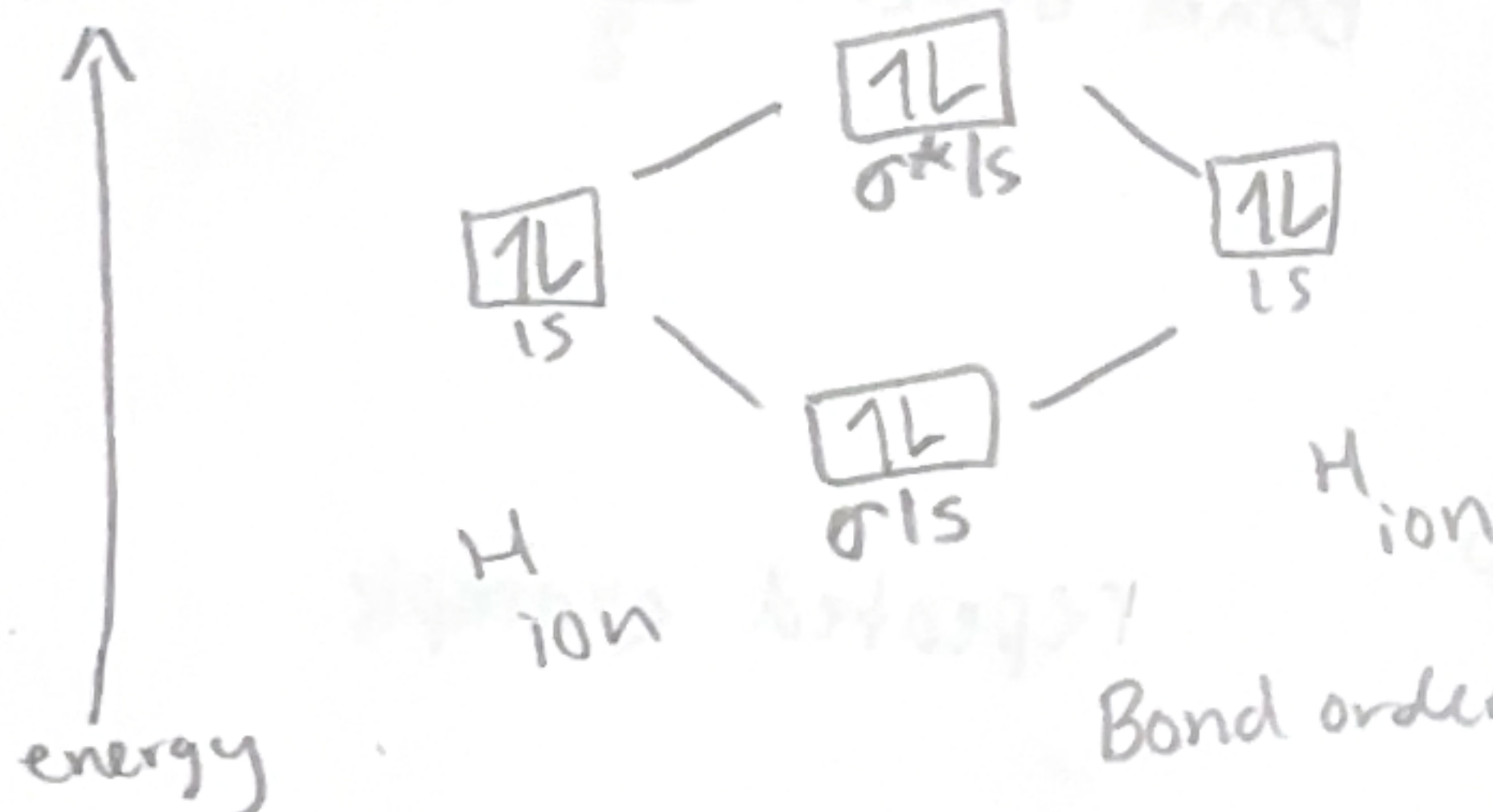
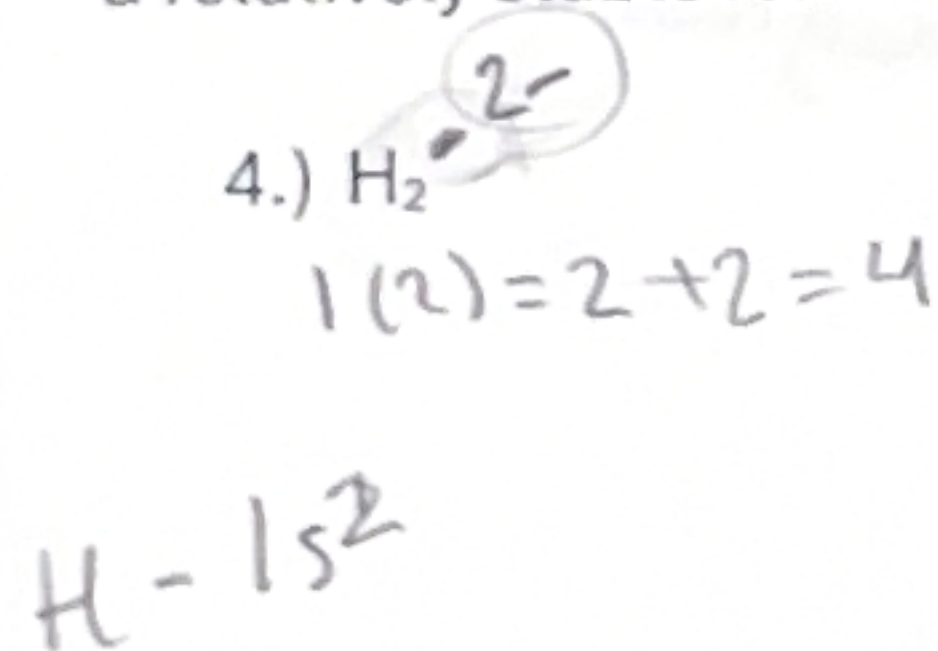
repeated example.



$$\text{Bond order} = \frac{8 - 3}{2} = 2.5$$

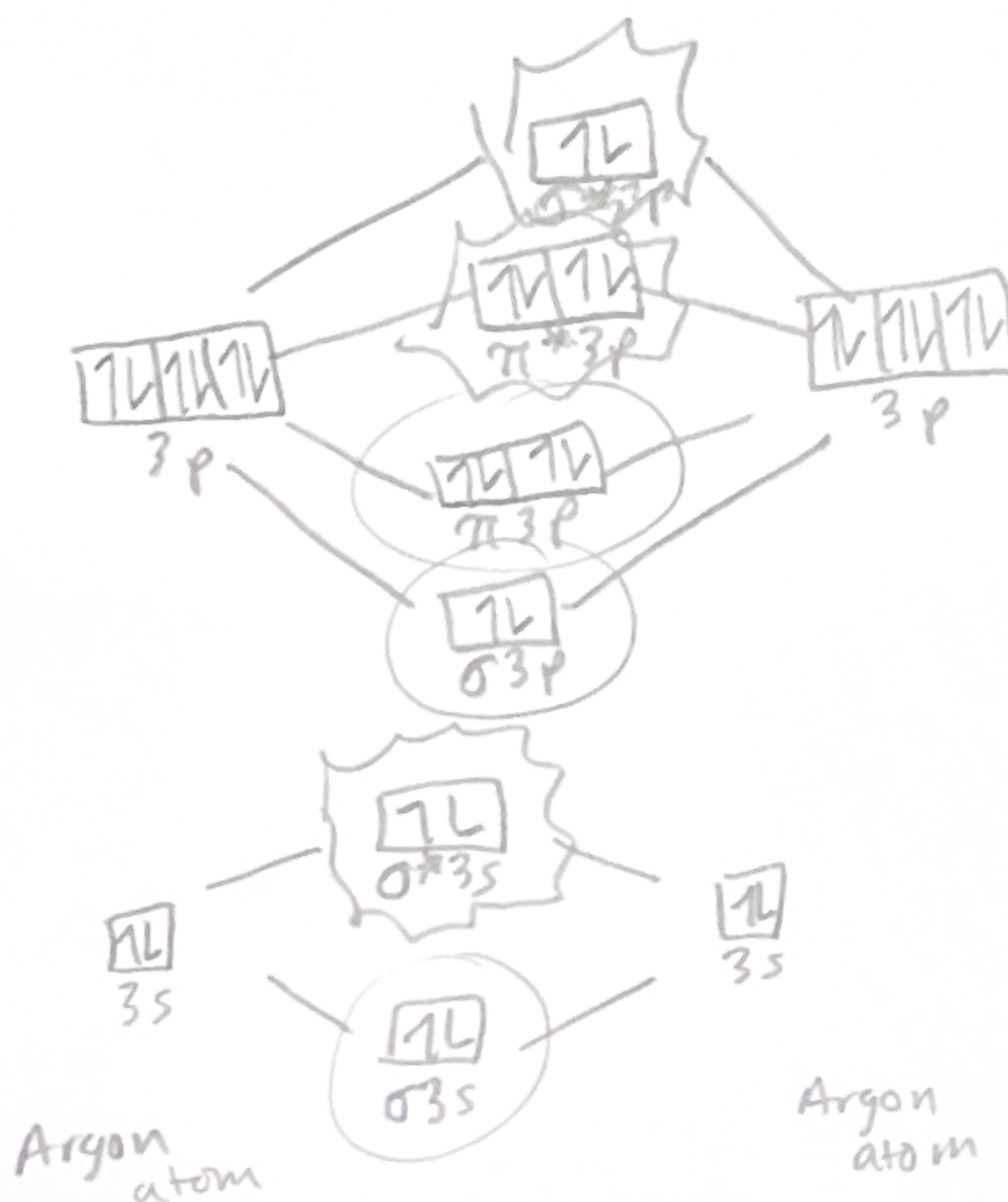
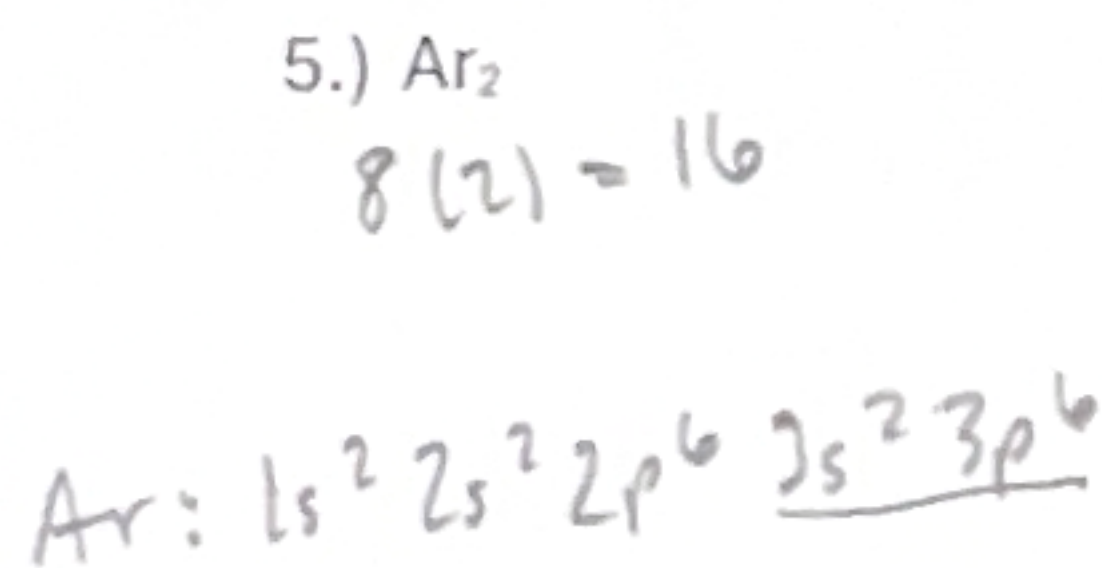
Paramagnetic

Use MO theory and calculate bond order to predict whether the molecules or ions exists in a relatively stable form.



$$\text{Bond order} = \frac{2 - 2}{2} = 0$$

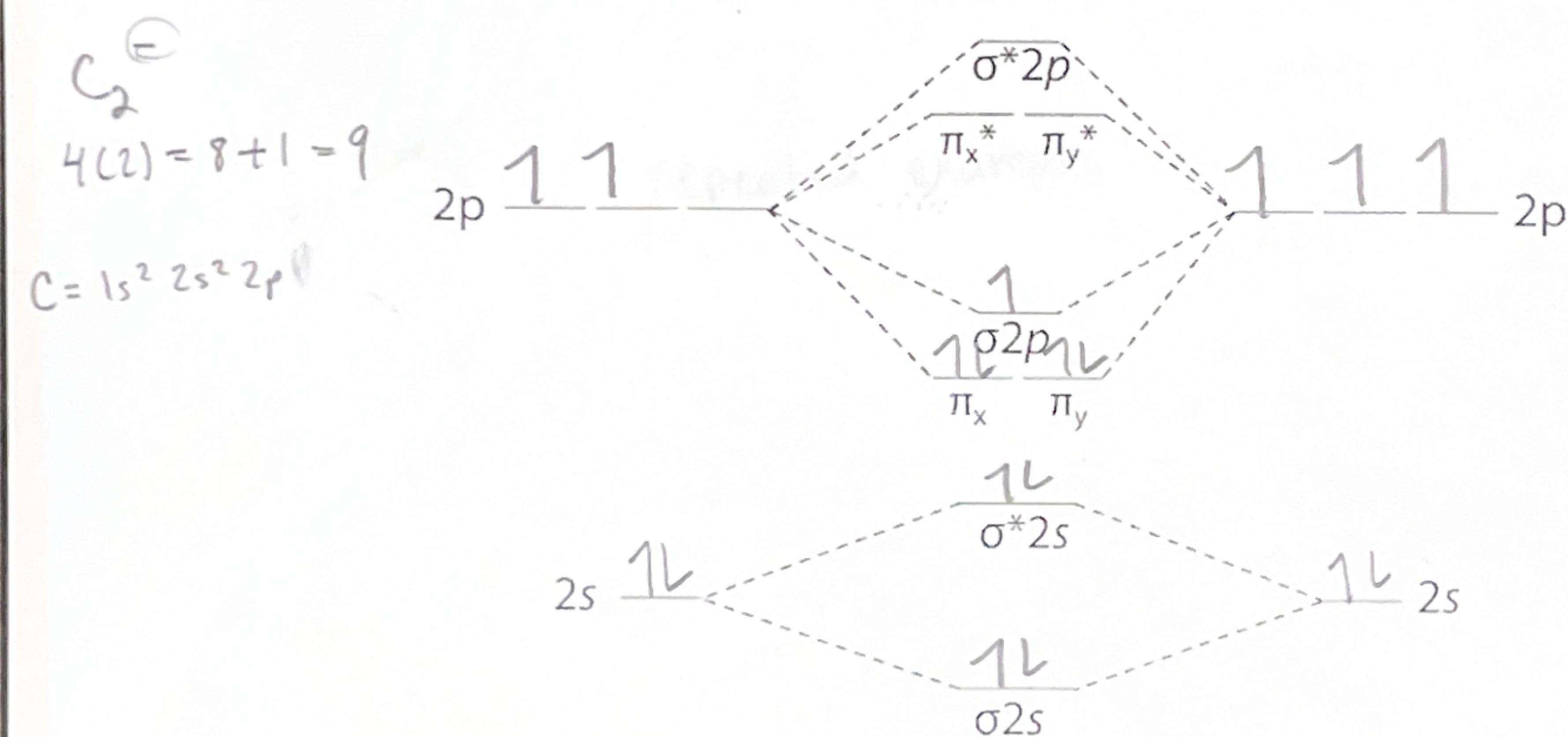
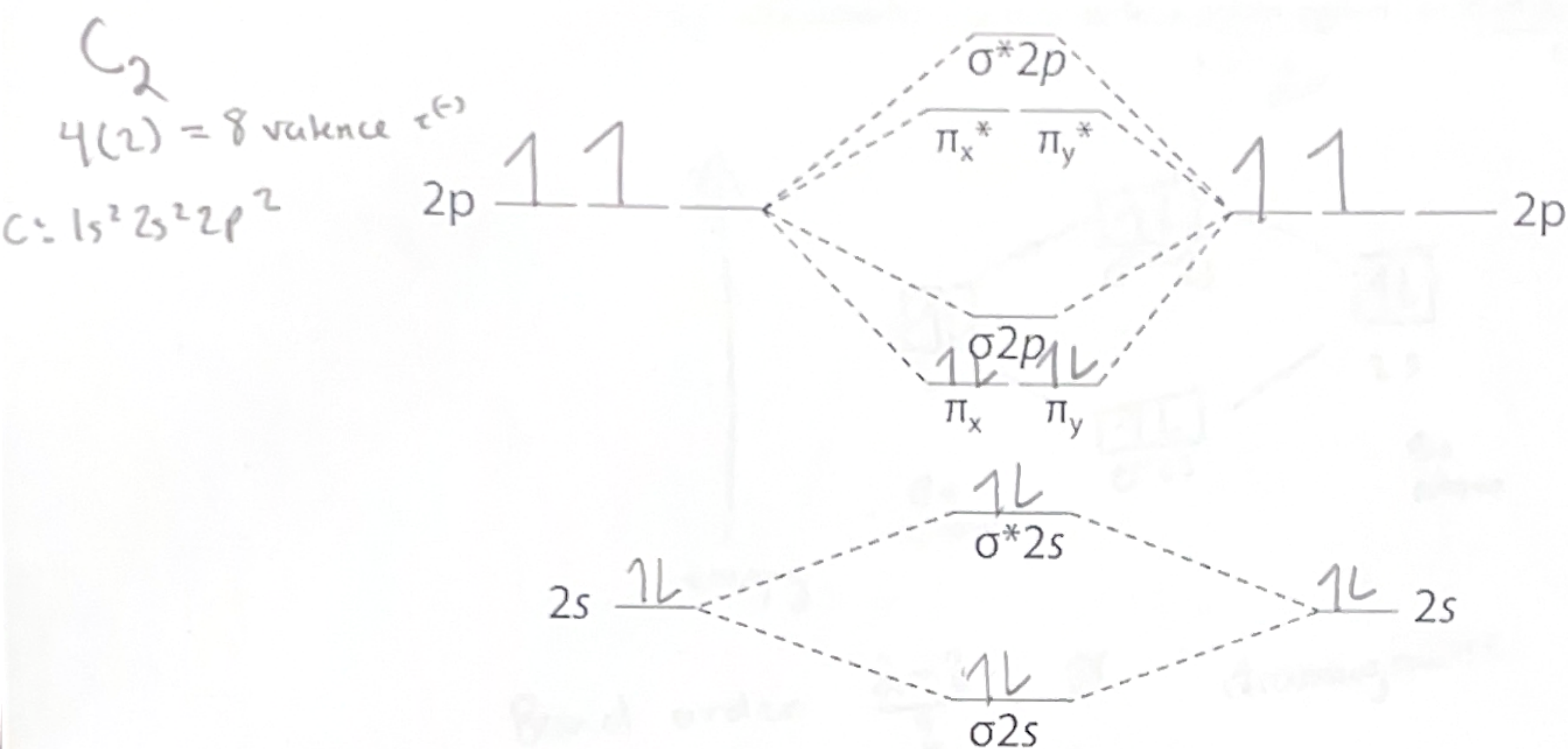
Not stable
Not possible



$$\text{Bond order} = \frac{8 - 8}{2} = 0$$

Not stable
Not possible.

Use the following outline to diagram the species C_2 , C_2^- . Determine the bond order of each and indicate whether they are stable. Note that C is one of the exceptions in which the $\pi 2p$ orbital fill before the $\sigma 2p$ orbitals.



Carbon
atom

Carbon
ion

Paramagnetic