

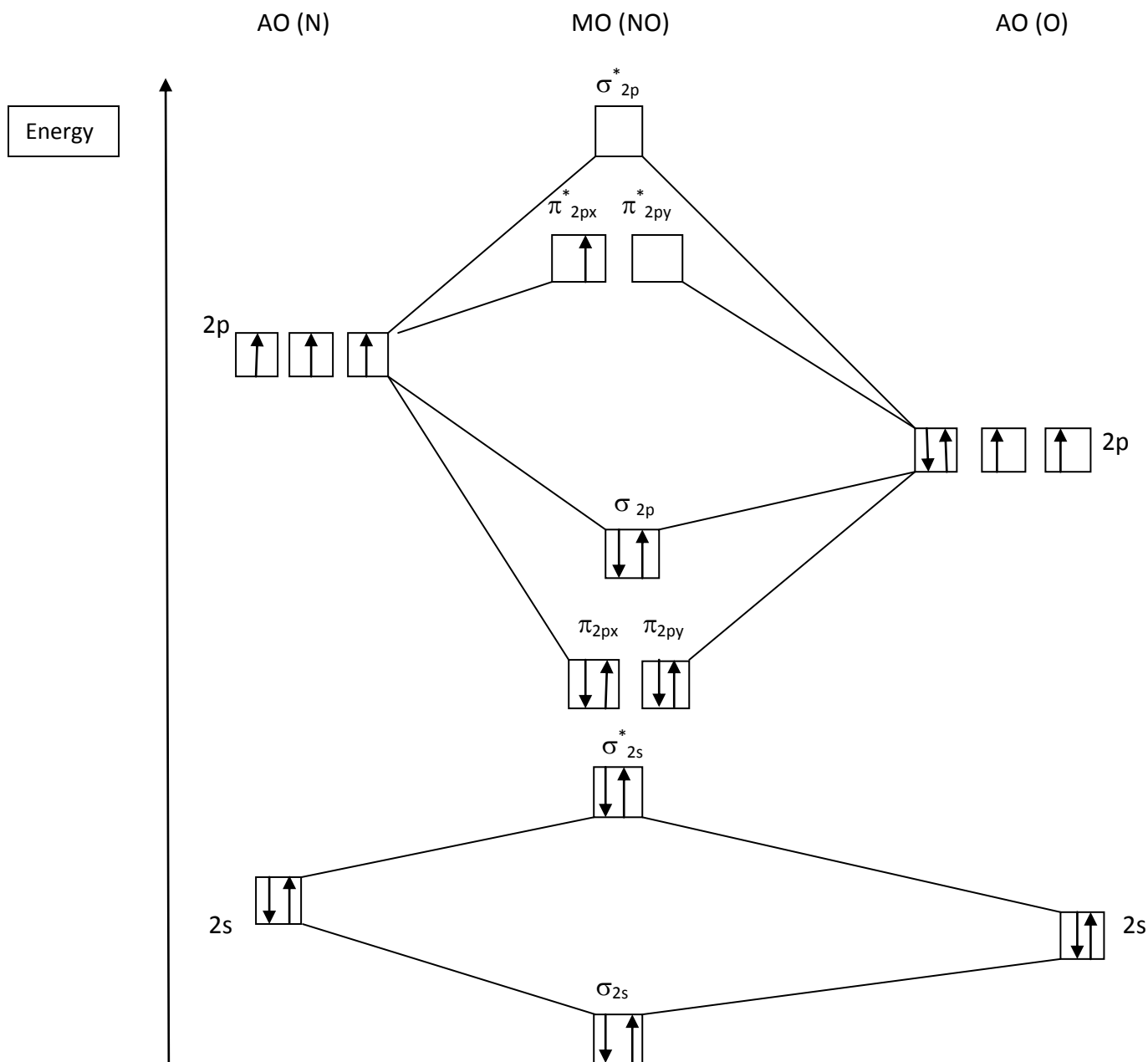
5. a) By writing molecular orbital configuration for each of following molecules calculate the bond order and also determine whether it is paramagnetic or diamagnetic.

(i) NO (ii) CO (iii) O₂

+

Solution

(i) **NO**

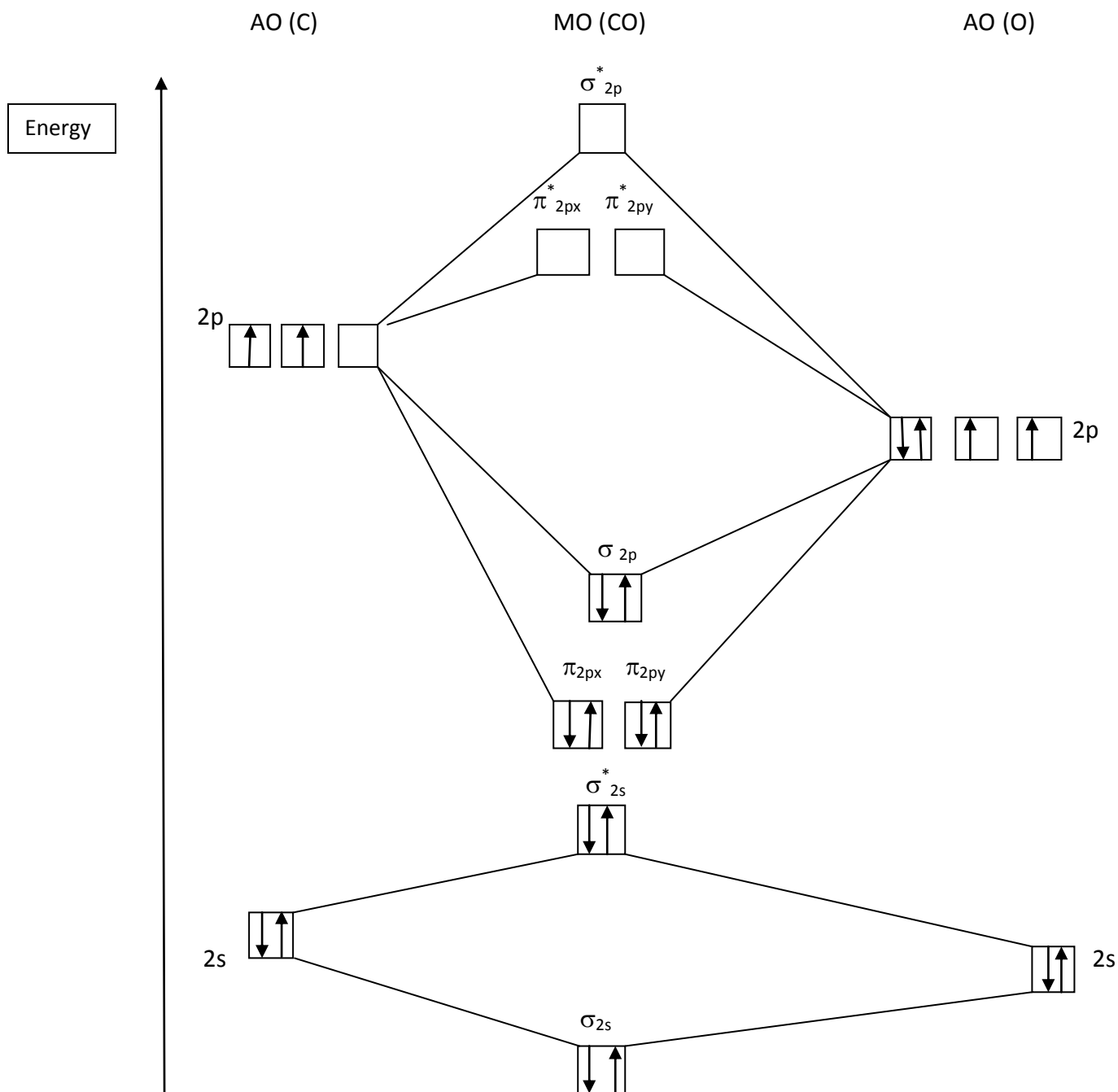


Electron configuration: $(\sigma_{2s})^2(\sigma_{2s}^*)^2(\pi_{2p})^4(\sigma_{2p})^2(\pi_{2p}^*)^1$

Bond order = $\frac{1}{2} (2-2+2+4-1) = 2.5$

Paramagnetic (has unpaired electron on MO)

(ii) CO

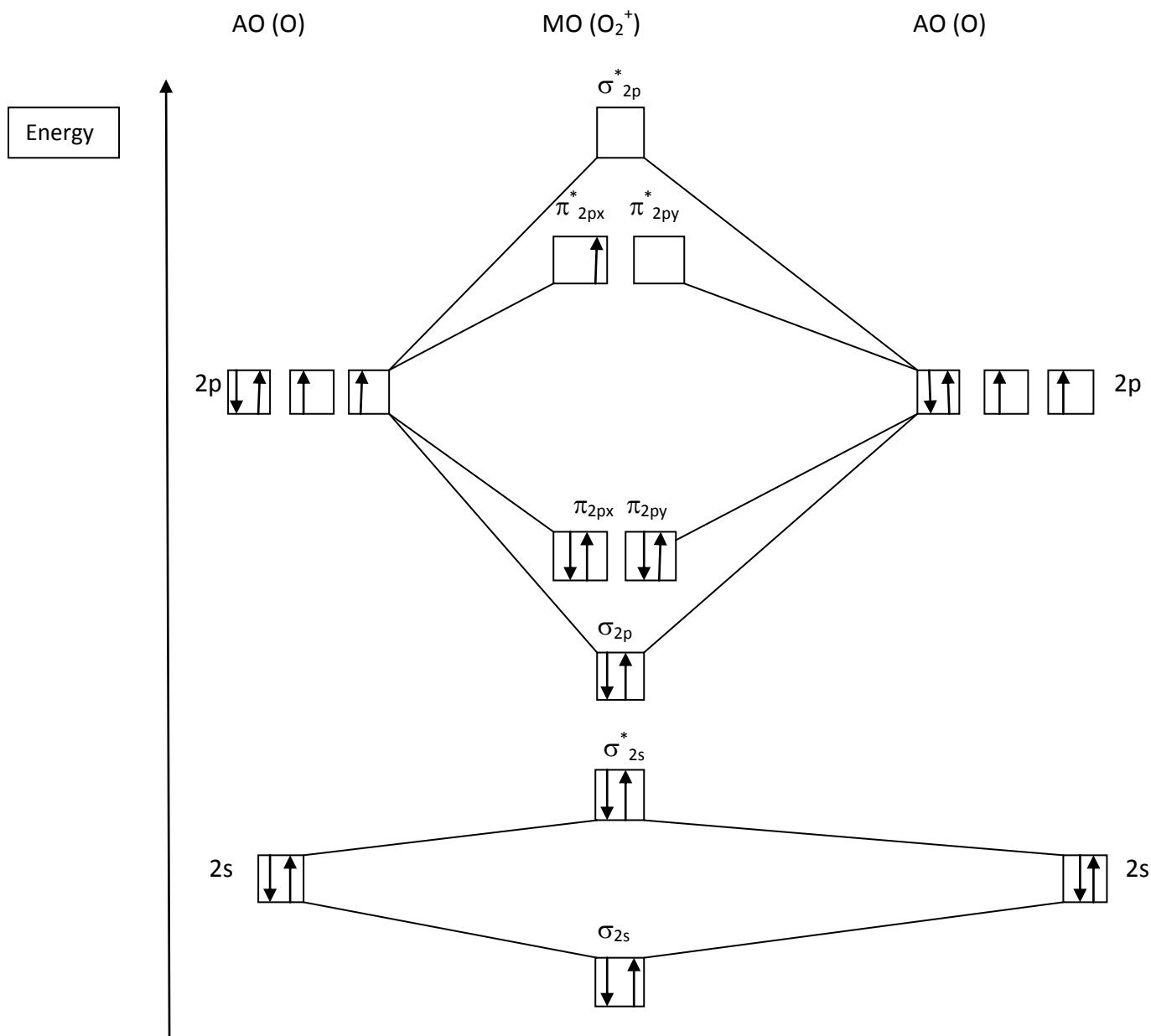


Electron configuration: $(\sigma_{2s})^2(\sigma_{2s}^*)^2(\pi_{2p})^4(\sigma_{2p})^2$

Bond order = $\frac{1}{2}(2-2+2+4) = 3$

Diamagnetic (hasn't unpaired electron on MO)

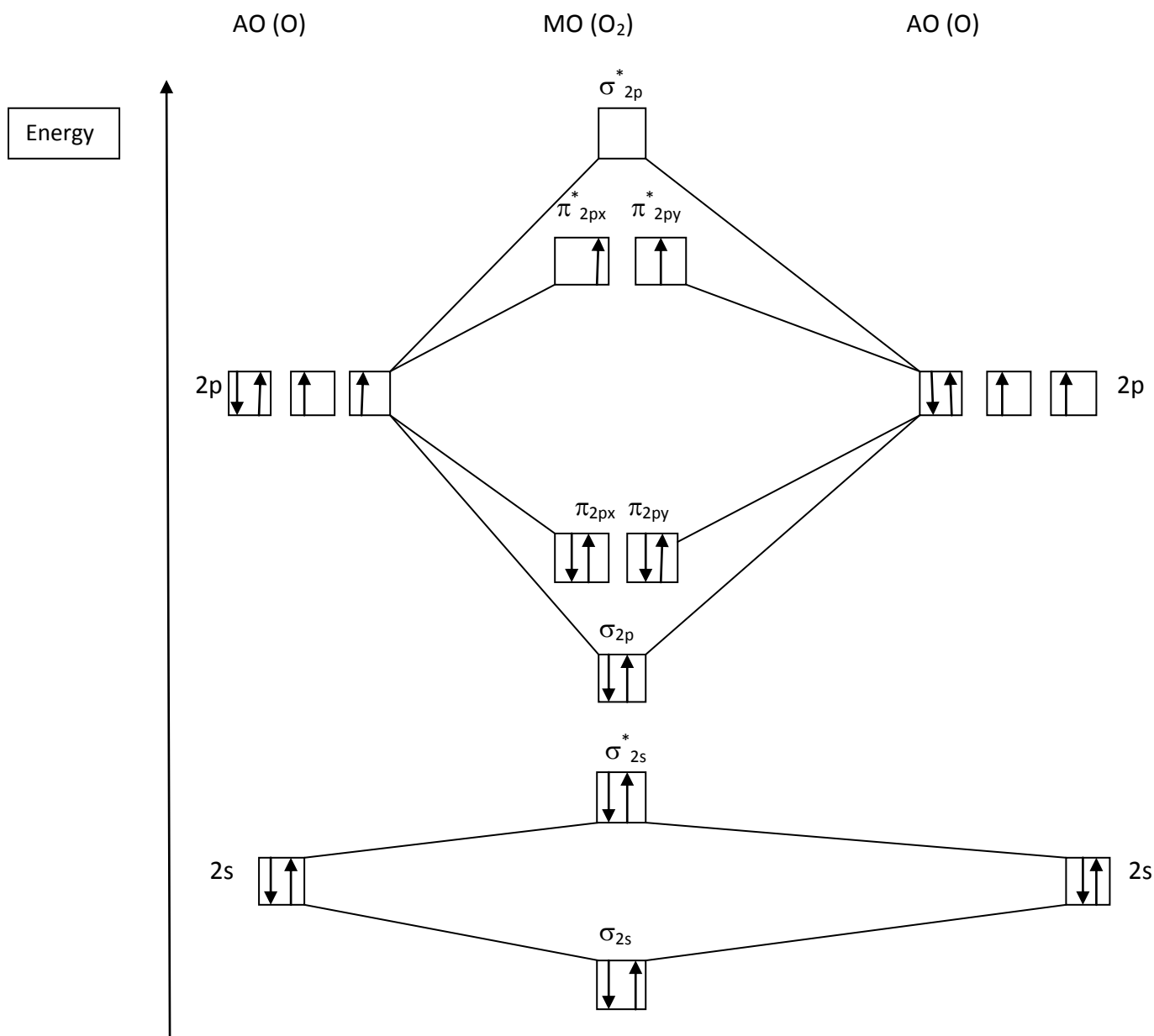
- (iii) Diagrams for O_2^+ and O_2 are shown as it is not clear from the task which one is required to describe



Electron configuration: $(\sigma_{2s})^2(\sigma_{2s}^*)^2(\sigma_{2p})^2(\pi_{2p})^4(\pi_{2p}^*)^1$

Bond order = $\frac{1}{2} (2-2+2+4-1) = 2.5$

Paramagnetic (has unpaired electron on MO)



Electron configuration: $(\sigma_{2s})^2(\sigma_{2s}^*)^2(\sigma_{2p})^2(\pi_{2p})^4(\pi_{2p}^*)^2$

Bond order = $\frac{1}{2} (2-2+2+4-2) = 2$

Paramagnetic (has unpaired electrons on MO)

Answer provided by AssignmentExpert.com