Clicker Question #2

Using Lewis Dot Structures, predict which molecule would be paramagnetic.

a.) F_2

b.) CO_2

c.) N_2

d.) NO

e.) none of the about

solution: NO has an odd number of electrons, so one will be unpaired

- electrons are treated like waves → the phase of the wave matters when two electrons interact
- if two orbitals interact → they can interact in phase or out of phase (constructively or destructively)
    - when they interact constructively, they form a **bonding orbital** → something that is lower in energy
    - when they interact destructively, they form an **antibonding orbital** → something that is higher in energy
    - put in two orbitals → get out two orbitals
    - s orbitals interact head on so they form sigma bonds → bonding 1s orbital is called σ 1s and the antibonding 1s orbital is called σ *1s
    - fill the σ1s orbital first because it is lower in energy → fill all orbitals in one energy before moving up to the next one
    - atoms choose to bond because their overall arrangement of electrons will be lower in energy
- **bond order =** $\frac{\#\ of\ electrons\ in\ bonding\ orbital - \#\ of\ electrons\ in\ antibonding\ orbitals}{2}$
    - (+) bond order = bond forms, molecule exists
    - 0 or (-) bond order = no bond forms, molecule does not exist

Clicker Question #3

What is the bond order for He_2^+ cation?

a.) 0

b.) 1

c.) 1.5

d.) .5

e.) 3

solution: combining one He with one He^+ → have 2 electrons in the bonding orbital and 1 electron in the nonbonding orbital. 2 - 1 / 2 = ½

why do noble gases not form bonds?