Key!

Ch. 9 Molecular Bonding and Geometry Theories

What is the range for these bonds?

Non – polar: 0.0 – 0.4

Polar: 0.4 – 1.8

Ionic: Anything greater than 2.0

Fill in the chart:

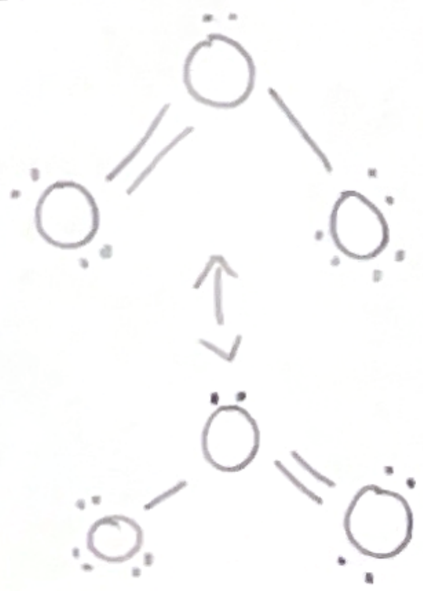
e- domain geometry	Molecular geometry	Bond angle	Hybridization
Linear	Linear	180°	Sp
Trigonal Planar	Trigonal Planar	120°	Sp^2
Trigonal Planar	Bent	120° (118°)	Sp^2
Tetrahedral	Tetrahedral	109.5°	Sp^3
Tetrahedral	Trigonal Pyramidal	107°	Sp^3
Tetrahedral	Bent	105°	Sp^3

Classify the following molecules as one of the molecular geometries mentioned above and confirm by drawing its Lewis dot structure.

a.) O_3

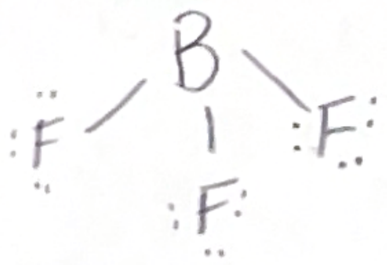
6(3) = 18
−4
14

Bent



b.) BF_3

3 7(3) = 24
−6
18



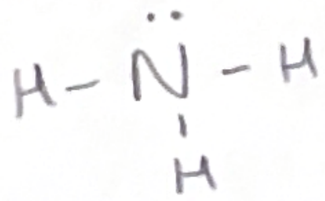
*Boron exception to octet rule

It's satisfied with 6 v.e⁻

Trigonal Planar

c.) NH_3

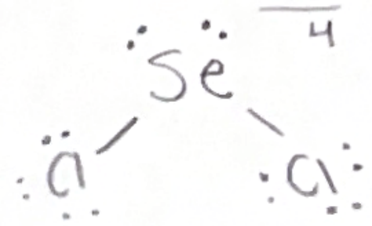
5 1(3) = 8
−6
2



Trigonal Planar

d.) $SeCl_2$

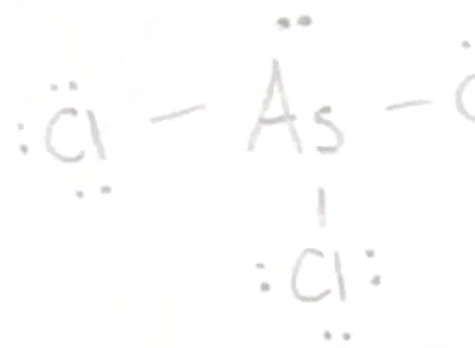
6 7(2) = 20
−4
16
−12
4



Bent

Using the VESPR model, give the molecular geometry, bond angles, and hybridization around the central atom in $AsCl_3$.

5 + 7(3) = 26
−6
20
−18
2



$e^{(-)}$ domain = tetrahedral

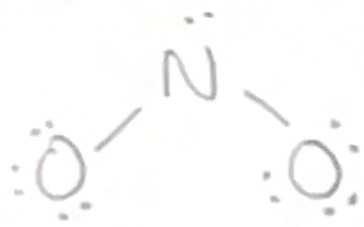
molecular geometry = Trigonal pyramid

Bond angle = 107°

Hybridization = sp^3.

Using the VESPR model, give the molecular geometry, bond angles, and hybridization around the central atom in the nitrite ion (NO_2^{-1}). Draw any other equivalent structures.

5 + 6(2) = 17 + 1 = 18

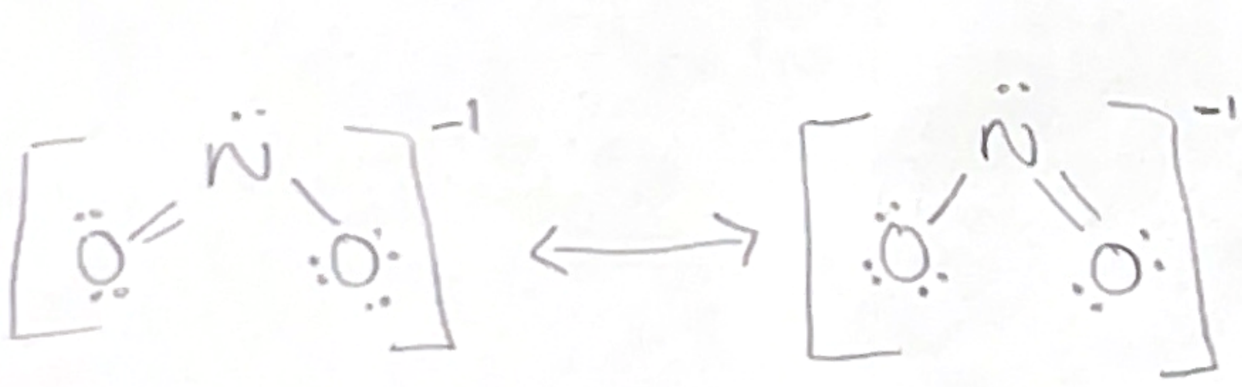


$e^{(-)}$ domain = Trigonal Planar

molecular geometry = Bent

Bond Angle = 120°

Hybridization = sp^2



From the previous Lewis structures, calculate the formal charge on the central atom.

F.C. = valence $e^{(-)}$ − (# bonds + free $e^{(-)}$)

↳ (count dots)

= 5 − (3 + 2)

= 5 − 5

F.C = 0

nitrogen