

**LEWIS STRUCTURES & RESONANCE****Exercises:**

Draw Lewis structure for each molecule or ion listed below. Follow the procedure discussed in lecture for drawing Lewis structures. Assign formal charges to each atom. Also, look for equivalent resonance structures and write the number of equivalent structures.

<b>Molecule or Ion</b>	<b># of Valence electrons</b>	<b>Lewis structure with formal charges</b>	<b>Draw possible resonance structures here. (If none, write NA)</b>
$C_2H_4$			
$C_2H_2$			
$XeF_4$			
$N_3^-$			
$NO_2^-$			

Molecule or Ion	# of Valence electrons	Lewis structure with formal charges	Draw possible resonance structures here. (If none, write NA)
H <sub>2</sub> O <sub>2</sub>			
CH <sub>3</sub> NCO			
BrO <sub>3</sub> <sup>-</sup>			
SF <sub>4</sub>			
IF <sub>5</sub>			
N <sub>2</sub> O <sub>4</sub> (O <sub>2</sub> N-NO <sub>2</sub> )			

**Questions:**

1. The table below lists the N–N bond dissociation energies and bond length for 3 molecules.

<b>Molecule</b>	<b>N–N bond dissociation energy (kJ/mol)</b>	<b>N–N bond length (pm)</b>
N <sub>2</sub>	942	110
N <sub>2</sub> H <sub>2</sub>	418	125
N <sub>2</sub> H <sub>4</sub>	167	145

- a) Draw the Lewis structures of the molecules listed above and determine the bond order in each molecule?

N–N bond orders:    N<sub>2</sub> \_\_\_\_\_    N<sub>2</sub>H<sub>2</sub> \_\_\_\_\_    N<sub>2</sub>H<sub>4</sub> \_\_\_\_\_

- b) Describe the correlation between the N–N bond energies and bond orders.

- c) Describe the correlation between the N–N bond lengths and bond orders.

2. Hydrogen isocyanide, HNC, will convert to hydrogen cyanide, HCN over time. Use their Lewis structures and formal charge distributions to explain why this happens.