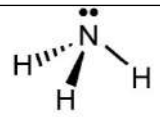
Name _____

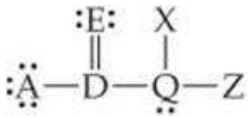
Honors Chapter 8.1 – 8.3 Practice Worksheet

Make a chart with the columns I have listed below. You may want to turn your paper sideways. Draw the correct 3-D Lewis dot structure for each molecule and use resonance when necessary. I included an example below.

Molecule	3-D Structure	Molecular Shape	Electron Domain Shape	Hybridization	Bond Angles	# σ bonds	# π bonds
NH_3		trigonal pyramidal	tetrahedral	sp^3	~109.5°	3	0

1. C_2H_6 (don't do 3-D, shapes, or hybridization)
2. SO_3
3. PCl_5
4. ICl_4^-
5. SF_4
6. CN^-
7. C_6H_6 (don't do 3-D, shapes, or hybridization)
8. SiO_2
9. XeF_4
10. NCl_3

11. In the Lewis structure shown below, A, D, E, Q, X, and Z represent elements in the first two rows of the periodic table. Identify all six elements so that the formal charges on all atoms are zero.



12. The following are three possible resonance structures for ClO_2. Use formal charges to select the resonance structure(s) that is/are preferred.

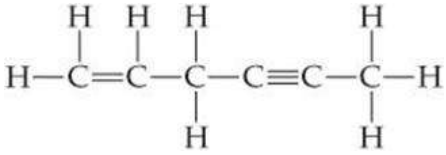
13. Using bond enthalpies from Table 8.4, estimate ΔH for the following reaction:

$$2CH_4 + O_2 \rightarrow 2CH_3OH$$

14. The molecule shown here is difluoromethane (CH_2F_2), which is used as a refrigerant called R-32.

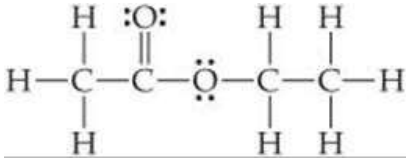
a. Based on the structure, how many electron domains surround the C atom in this molecule?
b. Would the molecule have a nonzero dipole moment?
c. If the molecule is polar, in what direction will the overall dipole moment point in the molecule?

15. Consider the hydrocarbon drawn below.



a. What is the hybridization at each carbon atom in the molecule?
b. How many σ bonds are there in the molecule?
c. How many π bonds?

16. Ethyl acetate, $C_4H_8O_2$, is a fragrant substance used both as a solvent and as an aroma enhancer. This Lewis structure is below.



a. What is the hybridization at each of the carbon atoms of the molecule?
b. What is the total number of valence electrons in ethyl acetate?
c. How many of the valence electrons are used to make σ bonds in the molecule?
d. How many valence electrons are used to make π bonds?
e. How many valence electrons remain in nonbonding pairs in the molecule?

17. Is the π bonding in NO_2^- localized or delocalized? How do you know?

18. Fill in the following chart. If the molecule column is blank, find an example that fulfills the conditions of the rest of the row.

Molecule	Electron-Domain Geometry	Hybridization of Central Atom	Dipole Moment? Yes or No
CO_2			
		sp^3	Yes
		sp^3	No
	Trigonal planar		No
SF_4			

19. In which one of the following processes are covalent bonds broken?
    a. $C_{10}H_{8(s)} \rightarrow C_{10}H_{8(g)}$
    b. $C_{(diamond)} \rightarrow C_{(graphite)}$
    c. $NaCl_{(s)} \rightarrow NaCl_{(molten)}$
    d. $NH_4NO_{3(s)} \rightarrow NH_4^+{}_{(aq)} + NO_3^-{}_{(aq)}$

20. Which one of the following molecules has a trigonal pyramidal geometry.
    a. CO_2
    b. H_2O
    c. CH_4
    d. C_2H_4
    e. PH_3