
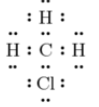
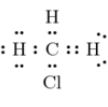
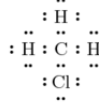
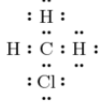
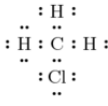
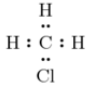
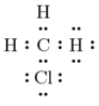
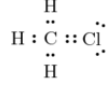



HW05 - Bonding Fundamentals

1 5 points

Select the correct Lewis dot structure for the molecule containing one C, one Cl, and three H atoms.

- 
 
 
- 
 
 
- 
 
 
- 

2 5 points

How would you classify the bond in O_2 ?

- covalent single bond
 covalent triple bond
 ionic bond
 covalent double bond

3 5 points

When drawing the Lewis structure for ammonia (NH_3), we get how many shared (S), needed (N), and available (A) electrons, and how many lone pairs (LP)?

- S = 3, N = 14, A = 8, LP = 1
 S = 6, N = 14, A = 8, LP = 1
 S = 6, N = 14, A = 8, LP = 0
 S = 6, N = 8, A = 14, LP = 1

4 5 points

How many lone pairs of electrons are on nitrogen in NF_3 ?

- zero
 three
 two
 one

5 5 points


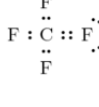



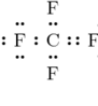


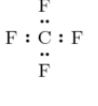

What are the values of S, N, and A for CH_3COCH_3 ?

S = shared electrons
N = needed electrons
A = available electrons

- S = 16
N = 40
A = 24
 S = 20
N = 44
A = 24
 S = 24
N = 20
A = 44
 S = 44
N = 20
A = 24

6 5 points

Select the correct Lewis Dot structure for the molecule containing one C and four F atoms.

- 
 
 
- 
 
 
- 
 
 
- 

7 5 points

Which of the following compounds contains exactly one unshared pair of valence electrons?

- SiH_4
 H_2S
 C_2H_4
 PH_3

8 5 points

Draw the Lewis Structure for CH_2O . How many lone pairs are found on the molecule?

- 4
 2
 1
 0

9 5 points

Which of the following describes the GC bond in acetylene (ethyne, C_2H_2)?

- double bond
 triple bond
 single bond
 1.5 bond in resonance

10 5 points

Resonance is a concept that describes the bonding in molecules...

- by asserting that electrons in a double bond can delocalize (spill over) onto adjacent single bonds to make a bond and a half.
 where there is more than one choice of location for a double or triple bond as deduced from Lewis dot structures. The true bonding is the average over all possible multiple bond locations.
 by asserting that double or triple bonds 'flip' or resonate between two locations in the molecule.

11 5 points

The carbonate ion (CO_3^{2-}) has how many resonance configurations?

- 3
- 4
- 2
- The carbonate ion does not exhibit resonance.

12 5 points

When measuring a carbon-carbon bond in benzene, a compound that exhibits resonance, you would find that...

- 50% of the time we would measure a single bond and 50% of the time we would measure a double bond
- the bond strength of each bonding region in resonance is close to the average of a single and double bond.

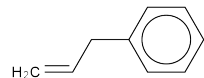
13 5 points

Calculate the formal charge on N in the molecule NH_3 .

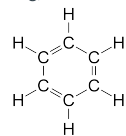
- 0
- 1
- 2
- 3

14 5 points

How many single bonds and double bonds (respectively) are represented by this condensed/skeletal formula?



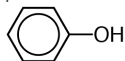
Note: that weird hexagon with a circle in it is seen all the time if you google certain organic molecules such as pharmaceuticals. It represents the resonance within a phenyl ring, similar to benzene (shown below):



- 11, 7
- 15, 14
- 12, 4
- 12, 14
- 15, 4

15 5 points

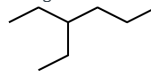
Consider the structural formula of a compound that happens to be the active ingredient in many oral anesthetics used in sore throat sprays. What is the molar mass of this compound?



- 50 g/mol
- 94 g/mol
- 17 g/mol
- 89 g/mol

16 5 points

The following is the skeletal structure for a compound.

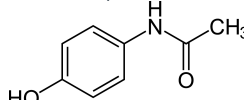


What is the molecular formula of this structure?

- C_8H_{18}
- C_8H_{16}
- C_8H_8
- C_8H_{24}

17 5 points

This is the condensed structural formula for the active ingredient in the over-the-counter medication Tylenol.



What is the empirical formula for this compound?

- $\text{C}_8\text{H}_5\text{NO}_2$
- $\text{C}_8\text{H}_9\text{NO}_2$
- $\text{C}_8\text{H}_{11}\text{NO}_2$
- $\text{C}_8\text{H}_8\text{NO}$

18 5 points

Consider the Lewis Structures of CO_2 and CH_3OH . Compared to the carbon-oxygen bonds in CO_2 , the carbon-oxygen bond in CH_3OH are...

- weaker and longer
- stronger and longer
- stronger and shorter
- weaker and shorter

19 5 points

Which is the correct order of increasing bond strength?

- single, double, triple
- triple, double, single
- double, single, triple
- double, triple, single

20 5 points

Draw the Lewis structures for O_2 and O_3 . Why does it take more energy to break apart the bond in O_2 ?

- The bond order in O_3 is greater than the bond order in O_2
- The bond order in O_2 is greater than the bond order in O_3
- The bond length in O_2 is greater than the bond length in O_3