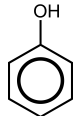


## HW08 - VSEPR

1 1 point

Consider the structural formula of phenol.

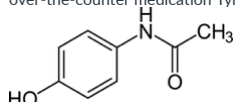


The active ingredient in some oral anesthetics used in sore throat sprays. What is the molar mass of phenol?

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

2 1 point

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

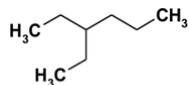


What is the molecular formula of acetaminophen?

- $C_8H_{11}NO_2$
- $C_8H_5NO_2$
- $C_8H_9NO_2$
- $C_8H_8NO$

3 1 point

The following structure is the carbon skeleton for a structural isomer of octane with most of the hydrogen and carbon atoms omitted.

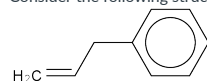


What is the molecular formula of this isomer?

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

4 1 point

Consider the following structure:



How many single bonds, double bonds, sigma bonds, and pi bonds (respectively) are represented by this condensed formula?

- 15, 4, 19, 4
- 12, 4, 16, 4
- 12, 4, 12, 4
- 11, 7, 18, 7
- 15, 4, 15, 4

5 1 point

The electronegativity of H is...

- a lot less than that of C.
- a lot more than that of C.
- about equal to that of C.

6 1 point

Which pair of bonded atoms has the largest dipole moment?

- C-N
- C-Cl
- C-O
- C-F

7 1 point

Consider a 3-atom molecule A-B-A for which B has a total of only four valence electrons - enough to make two bonds. Predict the A-B-A bond angle.

- $109.5^\circ$
- $180^\circ$
- $120^\circ$
- $90^\circ$

8 1 point

What is the shape (molecular geometry) of  $COCl_2$ ?

- trigonal pyramidal
- T-shaped
- tetrahedral
- trigonal planar

9 1 point

Which of the following has bond angles slightly LESS than  $120^\circ$ ?

- $O_3$
- $I_3^-$
- $NO_3^-$
- $SO_3$
- $SF_2$

10 1 point

Draw the Lewis structure for  $NO_2$ . How many single bonds, double bonds, triple bonds, and unshared pairs of electrons are on the central atom, in that order, when considering a single contributing structure (ignoring the averaging effects of resonance)?

- 4, 0, 0, 0
- 2, 0, 0, 2
- 0, 0, 1, 1
- 1, 1, 0, 1
- 1, 0, 1, 0

11 1 point

Determine the molecular geometry of the ion  $NO_2^-$ .

- linear
- none of these
- trigonal planar
- trigonal pyramidal
- bent or angular

12 1 point

What is the electronic geometry of  $IF_4^-$ ?

- trigonal bipyramidal
- tetrahedral
- square pyramidal
- square planar
- octahedral

13 1 point

What is the molecular geometry of  $IF_4^-$ ?

- square planar
- octahedral
- trigonal planar
- see-saw
- square pyramidal

14 1 point

Is  $\text{IF}_4^-$  non-polar?

- Yes, it is non-polar.
- It cannot be determined from the structure.
- No, it is polar.

15 1 point

What is the geometry around the left-most carbon in the molecule  $\text{CH}_2\text{CHCH}_3$ ?

- trigonal planar
- tetrahedral
- trigonal pyramidal
- linear

16 1 point

Which of the following has bond angles of  $90^\circ$ ,  $120^\circ$ , and  $180^\circ$ ?

- $\text{IF}_5$
- $\text{XeF}_4$
- $\text{SF}_4$
- $\text{ICl}_4^-$
- $\text{PF}_6^-$

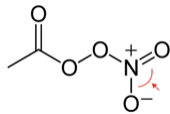
17 1 point

A central atom is surrounded by four chlorine atoms. Which of the following combinations is possible?

- an octahedral electronic geometry and square pyramidal molecular geometry
- an octahedral electronic geometry and tetrahedral molecular geometry.
- a trigonal bipyramidal electronic geometry and seesaw molecular geometry
- a trigonal bipyramidal electronic geometry and t-shaped molecular geometry

18 1 point

Consider the compound peroxyacetylnitrate, an eye irritant in smog.



Predict the indicated bond angle.

- slightly less than  $109.5^\circ$
- $120^\circ$
- $109.5^\circ$
- slightly less than  $120^\circ$
- $90^\circ$

19 1 point

Which of the following is a polar molecule?

- $\text{SF}_4$
- $\text{CCl}_4$
- $\text{CO}_2$
- $\text{XeF}_2$
- $\text{SO}_3$

20 1 point

Which of the following statements about polarity is FALSE?

- Dipole moments can "cancel," giving a net non-polar molecule.
- Lone (unshared) pairs of electrons on the central atom play an important role in influencing polarity.
- $\text{CCl}_4$  is a polar molecule.
- Linear molecules can be polar.
- Polar molecules must have a net dipole moment.

21 1 point

Which of the following molecules is nonpolar?

- $\text{H}_2\text{O}$
- $\text{BF}_3$
- $\text{NF}_3$
- $\text{SO}_2$
- $\text{CH}_3\text{Br}$

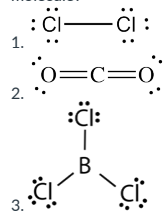
22 1 point

$\text{CHF}_3$  is (less, more) polar than  $\text{CH}_3\text{I}$  because...

- less, the C-H bond in  $\text{CHF}_3$  is a nonpolar bond.
- less, the tetrahedral geometry decreases the polarity of C-F bonds.
- less, the three polar C-F bonds are symmetrical and cancel the dipole moments.
- more, the C-F bonds are more polar than the C-I bonds.
- more, the C-H bond in  $\text{CHF}_3$  is a nonpolar bond.

23 1 point

Which of the following molecules contains polar covalent bonds but is NOT itself a polar molecule?



- 1 and 2 only
- 1 and 3 only
- 2 and 3 only
- 3 only
- none fit the criteria
- 2 only
- 1, 2, and 3

24 1 point

Which of the following molecules has the largest dipole moment?

- $\text{H}_2$
- $\text{HBr}$
- $\text{HI}$
- $\text{HCl}$
- $\text{F}$