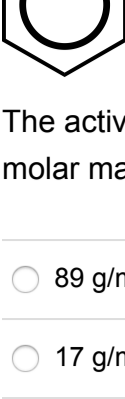


HW08 - VSEPR

Question 1

2 pts

Consider the structural formula of phenol.



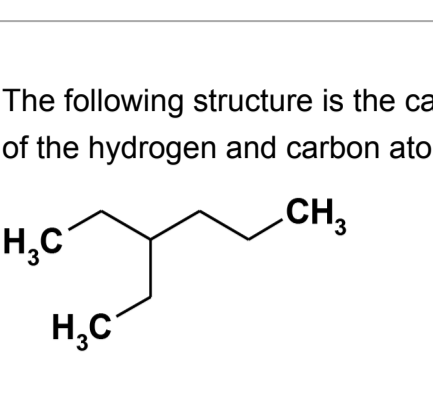
The active ingredient in some oral anesthetics used in sore throat sprays. What is the molar mass of phenol?

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

Question 2

2 pts

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?

- C₈H₉NO₂
 C₈H₉NO
 C₈H₁₁NO₂
 C₈H₉NO

Question 3

1 pts

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



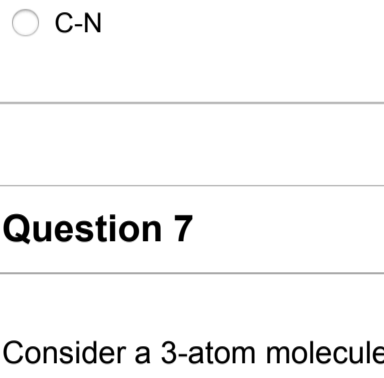
What is the molecular formula of this isomer?

- C₈H₁₆
 C₈H₂₄
 C₈H₈
 C₈H₁₈

Question 4

2 pts

Consider the following structure:



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

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

Question 5

1 pts

The electronegativity of H is...

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

Question 6

1 pts

Which pair of bonded atoms has the largest dipole moment?

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

Question 7

1 pts

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°
 120°
 90°
 180°

Question 8

1 pts

What is the shape (molecular geometry) of COCl₂?

- tetrahedral
 T-shaped
 trigonal planar
 trigonal pyramidal

Question 9

2 pts

Which of the following has bond angles slightly LESS than 120°?

- O₃
 SF₂
 SO₃
 NO₃⁻
 I₃⁻

Question 10

1 pts

Draw the Lewis structure for NO₂⁻. 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)?

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

Question 11

1 pts

Determine the molecular geometry of the ion NO₂⁻.

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

Question 12

1 pts

What is the electronic geometry of IF₄⁻?

- square pyramidal
 octahedral
 square planar
 trigonal bipyramidal
 tetrahedral

Question 13

1 pts

What is the molecular geometry of IF₄⁻?

- square pyramidal
 trigonal planar
 see-saw
 octahedral
 square planar

Question 14

1 pts

Is IF₄⁻ non-polar?

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

Question 15

1 pts

What is the geometry around the left-most carbon in the molecule CH₂CHCH₃?

- tetrahedral
 trigonal pyramidal
 linear
 trigonal planar

Question 16

2 pts

Which of the following has bond angles of 90°, 120°, and 180°?

- ICl₄⁻
 SF₄
 XeF₄
 IF₅
 PF₆⁻

Question 17

1 pts

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

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

Question 18

1 pts

Consider the compound peroxyacetyl nitrate, an eye irritant in smog.

Predict the indicated bond angle.

- slightly less than 120°
 109.5°
 120°
 90°
 slightly less than 109.5°

Question 19

1 pts

Which of the following is a polar molecule?

- CCl₄
 CO₂
 XeF₂
 SF₄
 SO₃

Question 20

1 pts

Which of the following statements about polarity is FALSE?

- Linear molecules can be polar.
 Polar molecules must have a net dipole moment.
 Lone (unshared) pairs of electrons on the central atom play an important role in influencing polarity.
 CF₄ is a polar molecule.
 Dipole moments can "cancel," giving a net non-polar molecule.

Question 21

1 pts

Which of the following molecules is nonpolar?

- CH₃Br
 H₂O
 SO₂
 NF₃
 BF₃

Question 22

2 pts

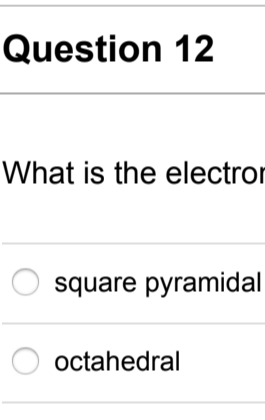
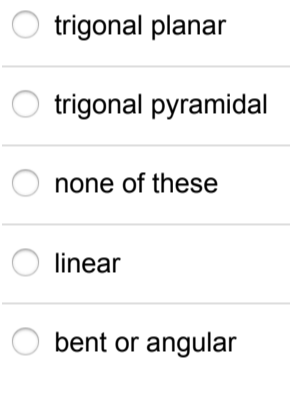
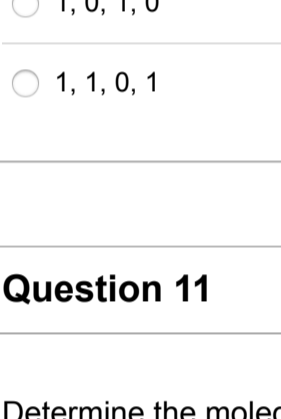
CHF₃ is (less, more) polar than CH₃ because...

- less, the C-H bond in CHF₃ is a nonpolar bond.
 less, the tetrahedral geometry decreases the polarity of C-F bonds.
 more, the C-H bond in CHF₃ is a nonpolar bond.
 more, the C-F bonds are more polar than the C-I bonds.
 less, the three polar C-F bonds are symmetrical and cancel the dipole moments.

Question 23

1 pts

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



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

Question 24

1 pts

Which of the following molecules has the largest dipole moment?

- HI
 HCl
 H₂
 HBr
 F₂