Quiz: 10.2–10.7

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Determine the electron geometry (eg) and molecular geometry (mg) of the underlined carbon in $\underline{C}H_3F$. 1) _____

A) eg=trigonal planar, mg=tetrahedral
B) eg=trigonal planar, mg=trigonal planar
C) eg=linear, mg=linear
D) eg=tetrahedral, mg=tetrahedral
E) eg=linear, mg=trigonal planar

2) What is the molecular geometry of SBr_4? 2) _____

A) square planar
B) square pyramidal
C) seesaw
D) tetrahedral

3) Using the VSEPR model, the molecular geometry of the central atom in BF_3 is _____. 3) _____

A) linear
B) tetrahedral
C) trigonal pyramidal
D) trigonal planar
E) bent

4) Using the VSEPR model, the molecular geometry of the central atom in SO_2 is _____. 4) _____

A) bent
B) trigonal pyramidal
C) linear
D) trigonal planar
E) tetrahedral

5) Using the VSEPR model, the molecular geometry of the central atom in NCl_3 is _____. 5) _____

A) linear
B) bent
C) tetrahedral
D) trigonal pyramidal
E) trigonal planar

6) Using the VSEPR model, the molecular geometry of the central atom in XeF_4 is _____. 6) _____

A) seesaw
B) square planar
C) square pyramidal
D) trigonal bipyramidal
E) tetrahedral

7) Using the VSEPR model, the electron-domain geometry of the central atom in BF_3 is _____. 7) _____

A) tetrahedral
B) trigonal bipyramidal
C) trigonal planar
D) linear
E) octahedral

8) Using the VSEPR model, the electron-domain geometry of the central atom in SF_2 is _____. 8) _____

A) trigonal planar
B) octahedral
C) linear
D) tetrahedral
E) trigonal bipyramidal

9) Determine the electron geometry, molecular geometry and polarity of N_2O (N central). 9) _____

A) eg=linear, mg=linear, nonpolar
B) eg= linear, mg=linear, polar
C) eg=tetrahedral, mg=linear, polar
D) eg=trigonal planar, mg=bent, nonpolar
E) eg=tetrahedral, mg=bent, polar

10) A molecule containing a central atom with sp hybridization has a(n) _____ electron geometry. 10) _____

A) tetrahedral
B) linear
C) square planar
D) bent
E) trigonal bipyramidal

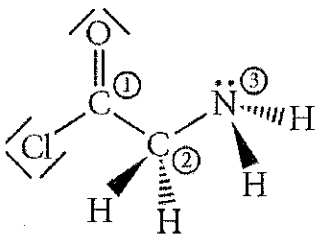
11) A molecule containing a central atom with sp^2 hybridization has a(n) _____ electron geometry. 11) _____

A) trigonal planar
B) linear
C) octahedral
D) bent
E) trigonal bipyramidal

12) A molecule containing a central atom with sp^3 hybridization has a(n) _____ electron geometry. 12) _____

A) bent
B) trigonal planar
C) tetrahedral
D) linear
E) octahedral

13) Consider the molecule below. Determine the molecular geometry at each of the 3 labeled atoms. 13) _____



A) 1=trigonal planar, 2=tetrahedral, 3=trigonal pyramidal
B) 1=trigonal planar, 2=trigonal pyramidal, 3=trigonal pyramidal
C) 1=tetrahedral, 2=tetrahedral, 3=trigonal planar
D) 1=tetrahedral, 2=tetrahedral, 3=tetrahedral
E) 1=trigonal planar, 2=tetrahedral, 3=tetrahedral

14) Determine the electron geometry (eg) and molecular geometry (mg) of the underlined atom 14) _____
$\underline{C}H_3OCH_3$.

A) eg=tetrahedral, mg=bent
B) eg=tetrahedral, mg=tetrahedral
C) eg=linear, eg=linear
D) eg=trigonal bipyramidal, mg=tetrahedral
E) eg=octahedral, mg=square planar

15) Determine the electron geometry (eg) and molecular geometry (mg) of the underlined atom 15) _____
$CH_3\underline{O}CH_3$.

A) eg=tetrahedral, mg=bent
B) eg=octahedral, mg=square planar
C) eg=linear, eg=linear
D) eg=trigonal bipyramidal, mg=tetrahedral
E) eg=tetrahedral, mg=tetrahedral

16) Determine the electron geometry (eg) and molecular geometry (mg) of the underlined atom $H_2\underline{C}O$. 16) _____

A) eg=trigonal planar, eg=trigonal planar
B) eg=tetrahedral, mg=tetrahedral
C) eg=tetrahedral, mg=bent
D) eg=trigonal bipyramidal, mg=tetrahedral
E) eg=octahedral, mg=square planar

17) Place the following in order of **increasing** X-Se-X bond angle, where X represents the outer atoms in each molecule. 17) _____

SeO_2 $SeCl_6$ SeF_2

A) $SeF_2 < SeO_2 < SeCl_6$
B) $SeCl_6 < SeF_2 < SeO_2$
C) $SeCl_6 < SeO_2 < SeF_2$
D) $SeO_2 < SeF_2 < SeCl_6$
E) $SeF_2 < SeCl_6 < SeO_2$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

18) Determine the molecular geometry about each interior atom in the following structure. Sketch the three-dimensional structure and label the interior atoms with the corresponding molecular geometry. 18) _____

$CH_2CHCCCH_3$

19) Is it possible for a molecule to be nonpolar even though it contains polar bonds? Explain your answer and give an example. 19) _____

1) D
2) C
3) D
4) A
5) D
6) B
7) C
8) D
9) B
10) B
11) A
12) C
13) A
14) B
15) A
16) A
17) B
18) The sketch should show all of the appropriate multiple bonds, with a double bond between carbons 1 and 2 and a triple bond between carbons 3 and 4. The first two carbons are trigonal planar, the second carbons are linear and the last carbon is tetrahedral.
19) Yes. The polarity of a molecule depends on the molecular geometry and whether or not all of the dipoles (polar bonds) cancel one another. If the molecular geometry causes all of the dipoles to cancel, the molecule will be nonpolar. An example is CF_4 where there are four polar bonds, but the dipoles sum to 0 making the molecule nonpolar.