

CH301 Worksheet 7—A practice Quiz 3

1. Classify the bonds in the following compounds as ionic, polar covalent, or non-polar covalent: NH_3 , LiF , H_2 , respectively.

- A. Polar covalent, ionic, non-polar covalent
- B. Ionic, polar covalent, non-polar covalent
- C. Polar covalent, non-polar covalent, ionic
- D. Ionic, non-polar covalent, polar covalent
- E. Non-polar covalent, ionic, polar covalent

2. In the Lewis structure for acetone, CH_3COCH_3 , all of the following bond angles, hybridizations, or electronic geometries are described by some part of the molecule EXCEPT:

- A. 120°
- B. sp^3
- C. Tetrahedral
- D. 90°
- E. Trigonal planar

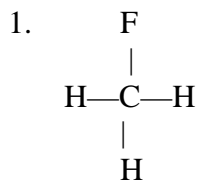
3. In the Lewis structure for methylamine, CH_3NH_2 , all the following bond angles, hybridizations, or electronic geometries are described by some part of the molecule EXCEPT:

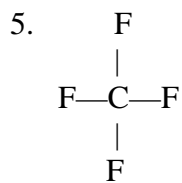
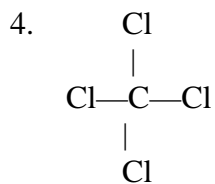
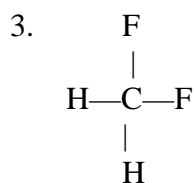
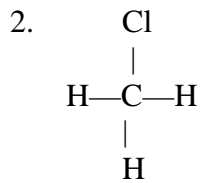
- A. sp^3
- B. Tetrahedral
- C. 120°
- D. 109.5°
- E. None of the above

4. Which of the following best describes the molecular geometry in ozone, O_3 ?

- A. Angular
- B. Linear
- C. 180°
- D. Pyramidal
- E. Both B and C

5. Rank the polarity of the following Lewis structures:





1. IV = V < II < I < III
2. II < I < III < IV < V
3. IV < V < II < I < III
4. I = II < III < IV = V
5. V < IV < III < II < I
6. IV = V < I = II < III

6. How many sigma and pi bonds do the following molecules have?

I. HC=CH

II. H₂C=CH₂

III. H₃C-CH₃

IV. H₂C=C=CH₂

1. I. 3,0; II. 2,0; III. 1, 0; IV. 4,0
2. I. 1,2; II. 1,1; III. 1, 0; IV. 2,2

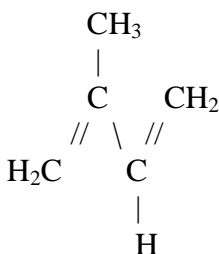
3. I. 4,1; II. 5,1; III. 7, 0; IV. 6,2
4. I. 2,3; II. 4,2; III. 7, 0; IV. 4,4
5. I. 3,2; II. 5,1; III. 7, 0; IV. 6,2

7. Which of the following are true about hybrid orbitals?

- I. They are used because atomic orbitals were not a good model for molecular bonding.
- II. They are the result of mixing atomic orbitals of various types.
- III. They always include at least one of each orbital type (s,p, and d).
- IV. The use of a hybridized orbital model better predicts molecular orbital energy, bonding patterns, as well as molecular shape.
- V. Unlike our previous models, which were only approximations of reality, hybridization really does reflect the absolute, empirical truth.

1. I, IV, V
2. I only
3. II only
4. I, II
5. I, III
6. I, II, IV
7. I, II, V

8. Here's a wacky molecule you might learn about later in organic chemistry or biochemistry, called isoprene. It's a building block for rubbers:



How many of the following orbital types do you spy involved with sigma and pi bonding: s, p, sp, sp², sp³ ?

1. Eight s, two sp, four sp², one sp³ for sigma and zero p for pi.
2. Eight s, zero sp, twelve sp², four sp³ for sigma and four p for pi.
3. Eight s, zero sp, four sp², one sp³ for sigma and two p for pi.
4. Four s, zero sp, twelve sp², four sp³ for sigma and four p for pi.
5. Eight s, zero sp, twelve p, four sp³ for sigma and four sp² for pi.