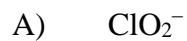


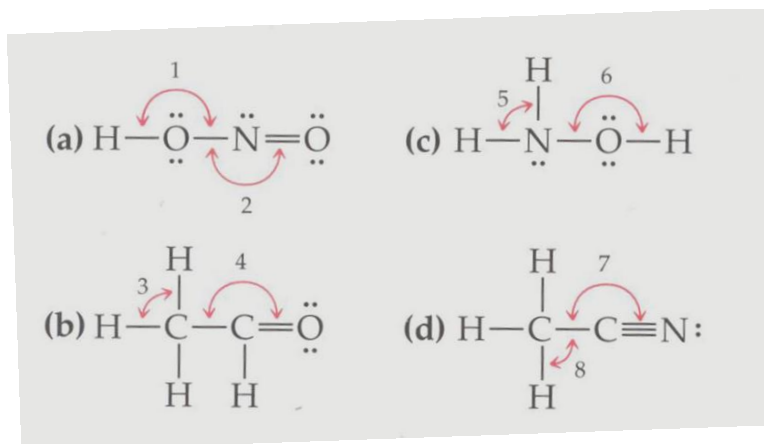
REVIEW QUESTIONS

## Chapter 10

1. Draw Lewis structures and determine the molecular geometry of each molecule or ion shown below:



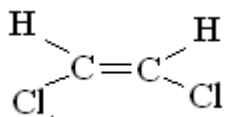
2. Give approximate value for each bond indicated in the molecules shown below:



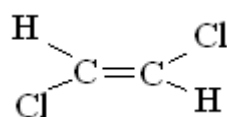
3. Determine if each molecule below would be polar or non-polar. Give a brief explanation for your choices.



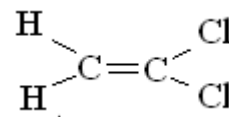
4. Dichloroethylene,  $\text{C}_2\text{H}_2\text{Cl}_2$ , can have any one of the geometries shown below, each of which is an individual substance.



(A)



(B)

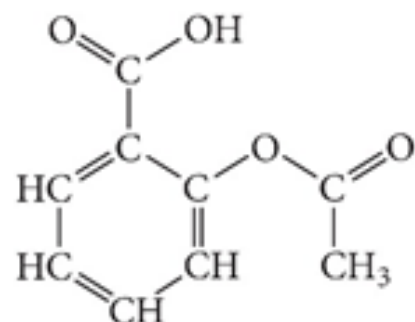


(C)

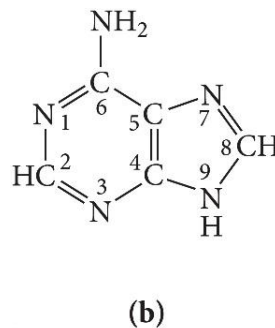
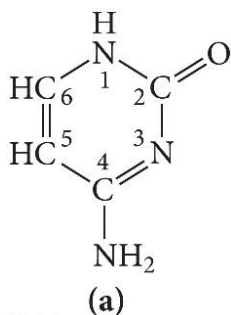
a) What is the geometry around each carbon atom in any of these molecules?

b) Which of these molecules would you expect to be non-polar? Explain.

5. The structure of acetylsalicylic acid (aspirin) is shown below. How many pi bonds are present in this compound? How many sigma bonds? What parts of the molecule are free to rotate, and what parts are rigid?

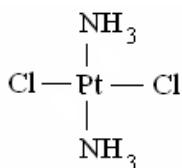


6. Shown below are cytosine and adenine, two bases that are important in the genetic coding. Assign a molecular geometry and hybridization to each interior atom numbered in these two bases.

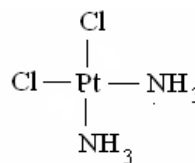


7. Which hybridization schemes allow the formation of at least one pi bond? Briefly explain why.

8. There are two compounds with the formula  $\text{Pt}(\text{NH}_3)_2\text{Cl}_2$ . Structure A is called cisplatin and is used in cancer therapy. Explain why these compounds are different from one another. Which structure do you expect to be polar?



(A)



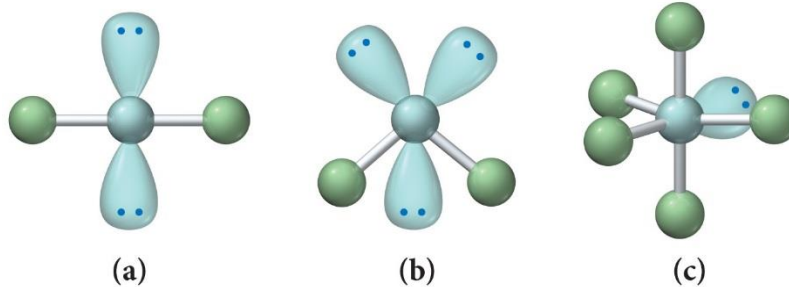
(B)

9. Butadiene,  $\text{C}_4\text{H}_6$ , is an important molecule found in natural rubber, and has the following structural formula:



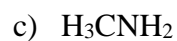
Determine the bond angle around each carbon and sketch the molecule showing its actual structure. Is this molecule planar or not? (Hint: build a model).

10. Each ball-and-stick model below shows the electron-pair and molecular geometry of a generic molecule. Explain what is wrong with each molecular geometry and provide the correct molecular geometry based on the number of lone and bonding pairs around the central atom.



11. Draw the Lewis structure for acetamide ( $\text{CH}_3\text{CONH}_2$ ) and determine the geometry about each interior atom. Experiments show that the geometry about the N atom in acetamide is nearly planar. Draw a resonance structure that can account for the planar geometry about the N atom.

12. Identify the hybridization and write the bonding schemes for each molecule or ion shown below. Label the bonds using notation discussed in class.



13. Shown below is the amino acid alanine. Identify the hybridization of each interior atom and write the bonding scheme for all the expanded bonds.

