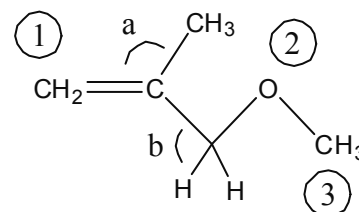


Questions for Review

Chem 1C Exam #1, Spring 09, Lingwood

1. Draw the Lewis structure of the krypton trifluoride ion, KrF_3^+ .
 - a. What is the geometry of this ion?
 - b. What is the hybridization of the krypton atom?
 - c. What is the hybridization of the fluorine atoms?
 - d. What are the formal charges of all atoms?

2. Consider the molecule shown at right.



- a. How many π bonds are in this molecule?
 - b. How many σ bonds are in this molecule?
 - c. What is the geometry and hybridization of carbon 1?
 - d. What is the geometry and hybridization of oxygen 2?
 - e. What is the geometry and hybridization of carbon 3?
 - f. What is the angle of "a"?
 - g. What is the angle of "b"?
3. Draw the molecular orbital diagram for CN . (assume the orbitals are in the same order as N_2)
 - a. What is the bond order of this molecule?
 - b. Is this molecule paramagnetic?
 - c. What do you have to do to change the bond order to 3?
 - d. Is your answer to part c) paramagnetic?
 4. Consider the three substances CO_2 , CHF_3 and CH_3OH .
 - a. List the dominant intermolecular forces for each molecule.
 - b. Which molecule has the highest boiling point?
 - c. Which molecule has the lowest melting point?
 5. Consider the four molecules $\text{CH}_3\text{CH}_2\text{CH}_3$, CH_3COCH_3 , $\text{CH}_3\text{CH}_2\text{OH}$ and HOCH_2OH .
 - a. Which has the highest boiling point?
 - b. Which has the lowest viscosity?
 - c. Which has the highest ΔH_{vap} ?
 - d. Which has the highest surface tension?
 - e. Which has the lowest vapor pressure?

6. What type of solid does each substance form?

- a. $\text{CH}_3\text{CH}_2\text{CH}_3$
- b. $\text{C}_{\text{diamond}}$
- c. Fe
- d. Ne
- e. NaNO_3

7. The normal boiling point of benzene is 80°C . What is the boiling point at a pressure of 350 torr? The ΔH_{vap} for benzene is 33.9 kJ/mol .

8. Consider the phase diagram of CO_2 at right.

- a. What happens to solid CO_2 at 1atm as you increase the temperature?
- b. Starting at the ●, what happens when you
 - i. Increase the temperature
 - ii. Decrease the temperature
 - iii. Increase the pressure
 - iv. Decrease the pressure

