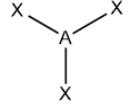
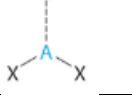
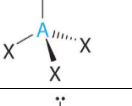
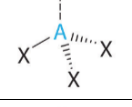
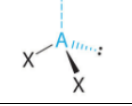
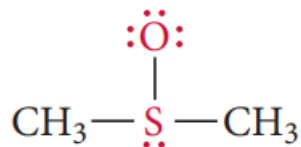
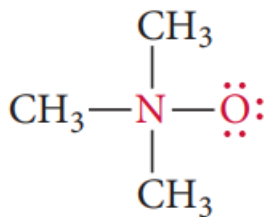


CHMB41 FSG Week 1 Worksheet
Carbon and Its Compounds - Hybridization

- Fill in the blanks.
 - Two ___ orbitals can overlap HEAD ON to form a σ (sigma) bond
 - Two ___ orbitals can overlap SIDEWAYS to form a π (p_1) bond
- The more the S character, the ___ stronger/weaker and the longer/shorter the bond is.
- What does VSEPR stands for? V ___ S ___ E ___ P ___ R ___
- Fill in the VSEPR table, the first one is already done for you.

Number of electron groups	Number of Lone pairs	Electron Geometry	Molecular Geometry	Approximate bond angles (°)	Hybridization	Drawing	An example of compound
2	0	linear	linear	180	sp	$X-A-X$	CO ₂
3	0						
	1						
4	0						
	1						
	2						

- What are the formal charges of the atoms shown in red?



N: _____

O: _____

O: _____

S: _____

CHMB41 FSG Week 1 Worksheet
Carbon and Its Compounds - Hybridization

6. Write the Lewis structure for each molecule.

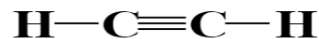
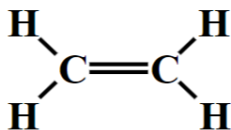
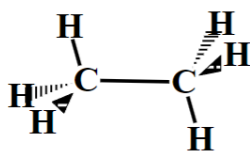
NO_3^- (Three possible structures)	NH_4^+	CH_3NO_2 (Two possible structures)
C_2H_2	H_3COCH_3	NO_2^-
HSO_3^-	CH_3CHO	CH_3COOH
$\text{CH}_3\text{S}(\text{O})\text{CH}_3$	CH_3^-	HSO_3^+

7. Draw the following molecules as Lewis structures and identify the dipole moments.

$\text{CH}_3\text{CH}_2\text{CHO}$	$\text{CH}_3\text{CH}_2\text{O}^-$	$(\text{CH}_3\text{CH}_2)_3\text{N}$	CH_3CN

CHMB41 FSG Week 1 Worksheet
Carbon and Its Compounds - Hybridization

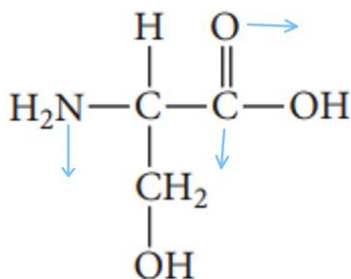
8. Rank the bond lengths and bond energies (1 = highest, 3 = lowest) of ethane, ethylene, and acetylene. Provide a brief explanation why.



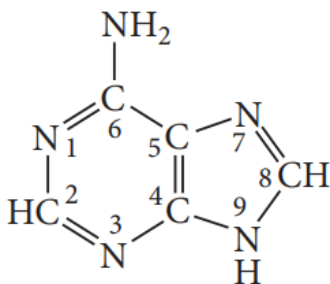
Bond lengths order:

Bond energies order:

9. What is the hybridization of the selected atoms?



10. Adenine is one of the four nitrogenous bases that codes the DNA. Assign electron geometry and hybridization to each interior atom marked with numbers.



- | | | |
|----------|----------|----------|
| 1. _____ | 4. _____ | 7. _____ |
| 2. _____ | 5. _____ | 8. _____ |
| 3. _____ | 6. _____ | 9. _____ |

11. Assign formal charges (non-zero) to those atoms that have them.

The chemical structure shows 2-methyl-6-propyl-2,4,6-octatriene. The conjugated pi system is highlighted with blue arrows pointing to the following carbon-carbon double bonds: C1=C2, C3=C4, C5=C6, and C7=C8. The methyl group on C2 and the propyl group on C6 are shown as substituents on the conjugated chain.