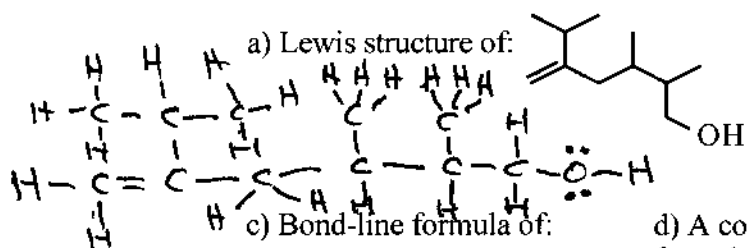
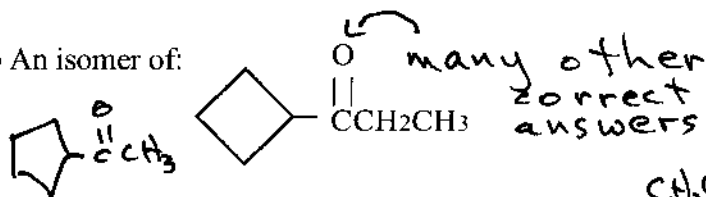


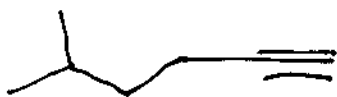
1. Draw structures as indicated.



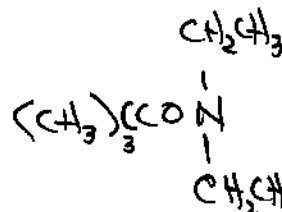
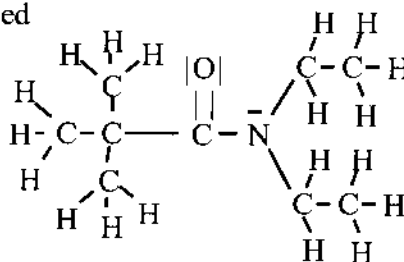
b) An isomer of:



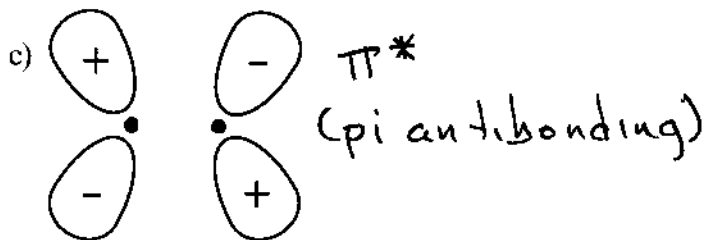
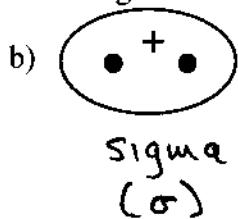
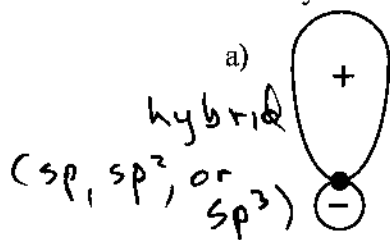
c) Bond-line formula of:



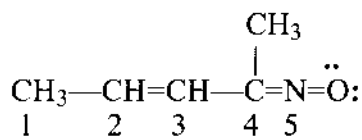
d) A condensed formula of:



2. Identify each of the following orbitals.



3. Consider the molecule shown: What is:



a) the hybridization of N5 sp

b) the hybridization of C2 sp²

c) the C2-C3-C4 bond angle 120° (approximately)

d) the geometry of C4 trigonal planar

e) the formal charge on N +1

f) the formal charge on O 0

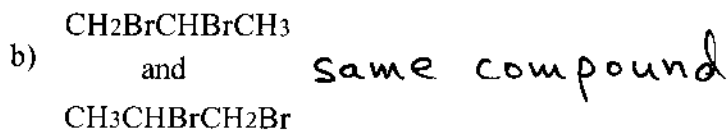
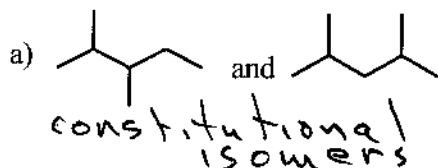
4. Give the information requested about the molecule $\text{CH}_3-\text{CH}=\text{CH}_2$.

a) Which carbon-carbon bond is the longest? 1

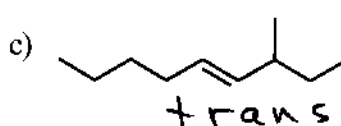
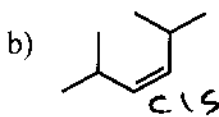
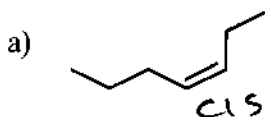
b) Which carbon-carbon bond is the strongest? 2

c) Bond 2 is composed of a σ bond made from head-to-head overlap of sp² orbitals and a π bond made from side-to-side overlap of p orbitals.

5. What is the relationship between the structures shown below? (Possible answers: Different compounds that are not isomers, different compounds that are constitutional isomers, the same compound, resonance contributors.)

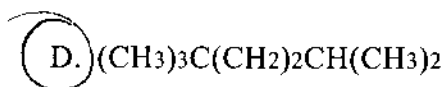
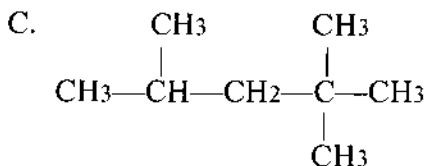
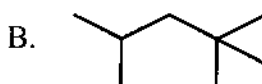
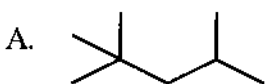


6. Identify each of the following as cis, trans, or neither.

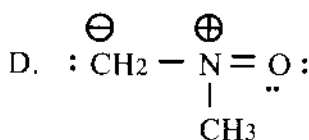
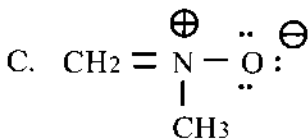
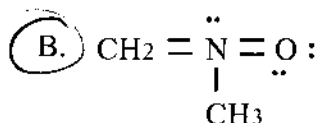
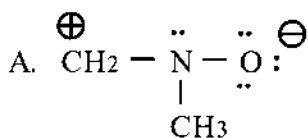


Multiple Choice:

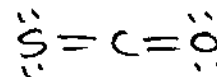
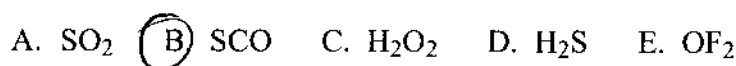
7. Which of these formulas represents a different compound from the others?



8. Which of the following is NOT a permissible resonance form?



9. Which of these molecules is linear? (Hint: draw a Lewis structure before you decide).



10. How many 2p atomic orbitals from boron must be mixed with a 2s atomic orbital to yield the bonding hybrid atomic orbitals in BF_3 ?

