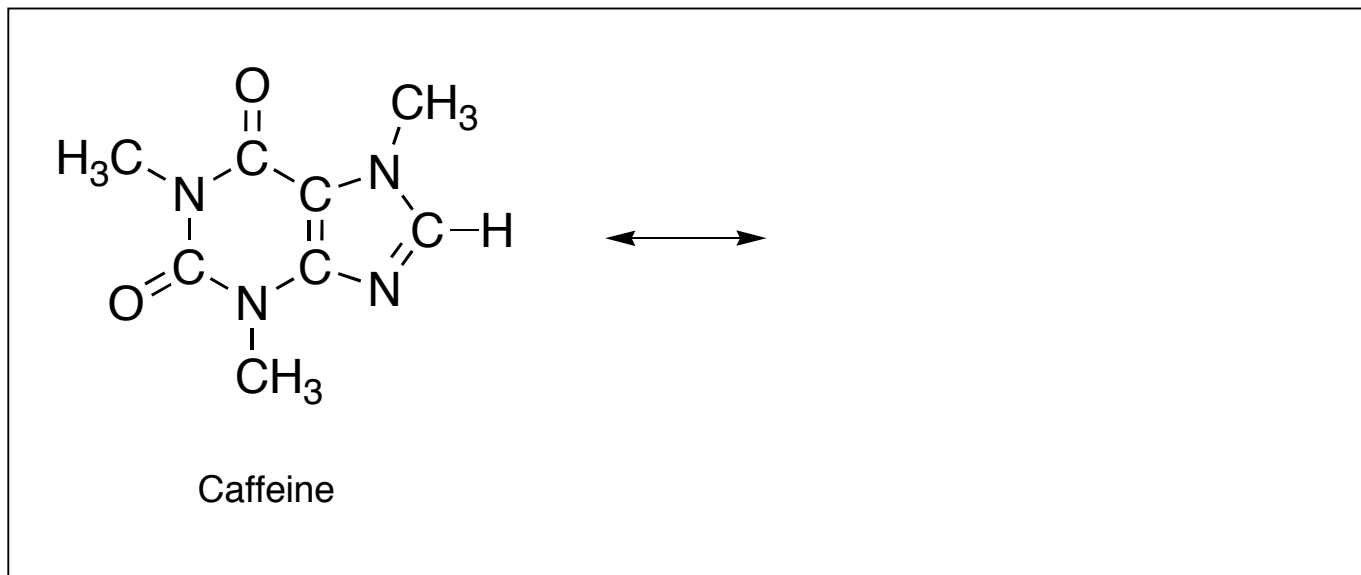


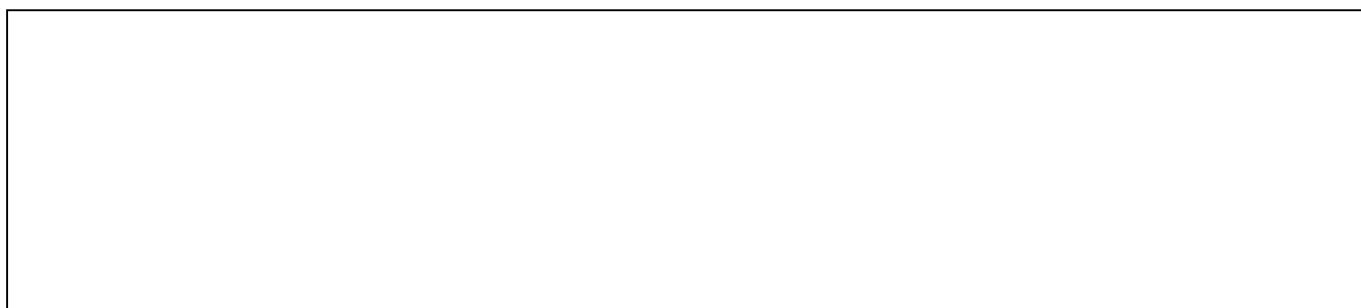
Name: _____

CHEM116L Section 1 Mini-Test
September 14, 2005

- 1) A partial Lewis structure of caffeine is shown below. Draw in the nonbonding electrons to complete its Lewis structure. Then provide a resonance structure in which all of the nitrogens are sp^2 hybridized. In all cases, indicate positive or negative charges where applicable. (10 points)



- 2) **A.** Carbon monoxide, CO, has two major resonance contributors, one containing formal charges on its atoms and one with no formal charges. Provide both resonance structures below, showing all nonbonded electrons and formal charges where applicable. Then answer the question that follows. (8 points)



- B.** Circle the structure that is *most* likely to react with a Lewis base such as $\text{:}\ddot{\text{O}}\text{H}^-$ and indicate where the Lewis base is most likely to react below. Provide a short explanation for your choice using only the space provided below. (5 points)

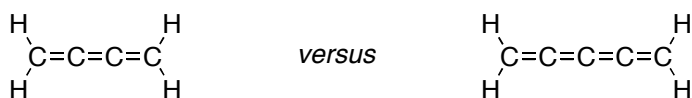
Name: _____

3) For each pair of molecules shown below, select the one that best fits the accompanying description by circling it. Provide a concise but thorough rationale for each of your decisions using words and pictures. *Note: a picture is required to receive full credit on most of these. Do not exceed the space provided. (5 points each)*

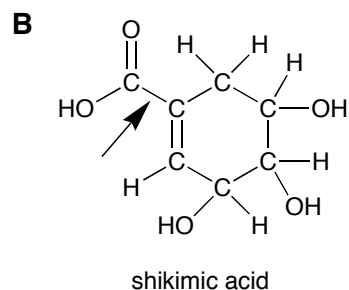
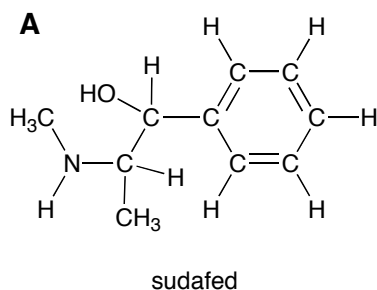
A. The higher melting point?



B. The molecule in which all hydrogens lie in the same plane?



4) Following are two compounds that have been studied in the Poon research group. Refer to the structures shown and answer the questions that follow. (2 points for part A, 3 pts each for parts B & C)



A. Which compound contains a ring in which the carbons of the ring lie in the same plane? **A B both** (circle one)

B. What atomic or hybridized orbitals participate in the bond indicated by the arrow? _____

Is this bond longer or shorter than 1.54 Å? **longer shorter not enough info** (circle one)

C. Which compound has the higher melting point and why (assume that their masses do not differ significantly)?