

Chemistry 325  
Fall, 2008  
Examination #1  
Wednesday, October 1, 2008

The time limit for this examination is 50 minutes. The maximum score possible for this examination is 100 points. You may use molecular models.

NAME: \_\_\_\_\_

SECTION I. Nomenclature [20 points]

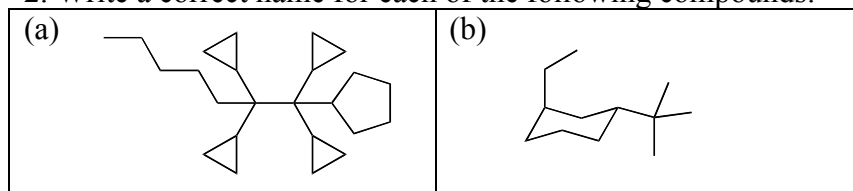
1. Draw the structures of each of the following compounds.

(a) *cis*-3-methyl-1-isopropylcyclopentane

(b) *trans*-1,4-diisobutylcyclohexane

(a)	(b)
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2. Write a correct name for each of the following compounds:

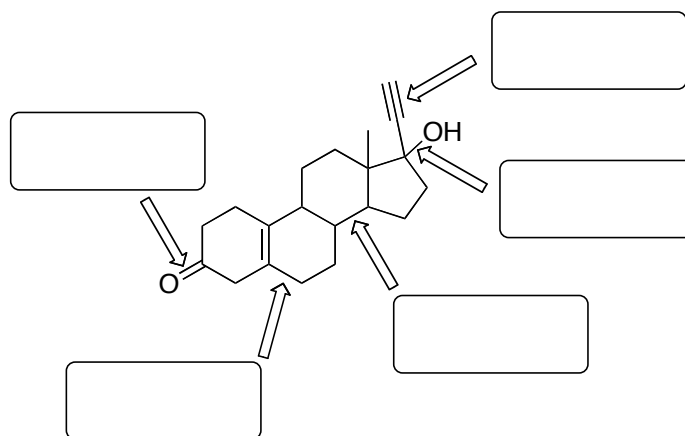


(a) \_\_\_\_\_

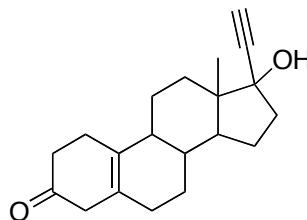
(b) \_\_\_\_\_

SECTION II. Structure and bonding [70 points]

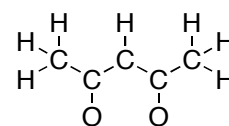
1. Indicate the hybridization of each atom in the bonds indicated in the structure of the oral contraceptive norethindrone, shown at right [10 pts]



2. Circle and name the functional groups of the norethindrone molecule [8 pts]



3. Acetylacetone reacts with base to give a singly-charged anion whose  $\sigma$  bonds are arranged as shown. Draw three contributing canonical forms to the resonance hybrid of this anion [4 pts each; 12 pts]



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4. Draw the Newman projections of all the possible staggered conformations of the 3,4-bond in 3,4-diethylhexane. Circle the lowest energy staggered conformation; if all conformations are of equal energy, circle them all. [14 pts]

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5. Draw the lowest-energy conformation of *cis*-1-isopropyl-3-methylcyclohexane. [6 pts]

6. Draw the Lewis structure of guanidinium cation,  $\text{CH}_5\text{N}_3^+$ , given that all three nitrogen atoms are bonded to the carbon atom, and that no hydrogen atom is bonded to carbon. If more than one structure can be drawn, draw all possible structures. [18 pts]

7. The name 2,6-diethyl-2,6-dipropylheptane is incorrect, but you can draw the correct structure of the compound based on it. Draw the structure of this hydrocarbon, and write its correct IUPAC name. [12 pts]

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