

S2019 Organic Chemistry I  
Mid-Term Exam 1

Name (print):

Name (Sign):

Recitation Instructor Name (so we can get it back to you):

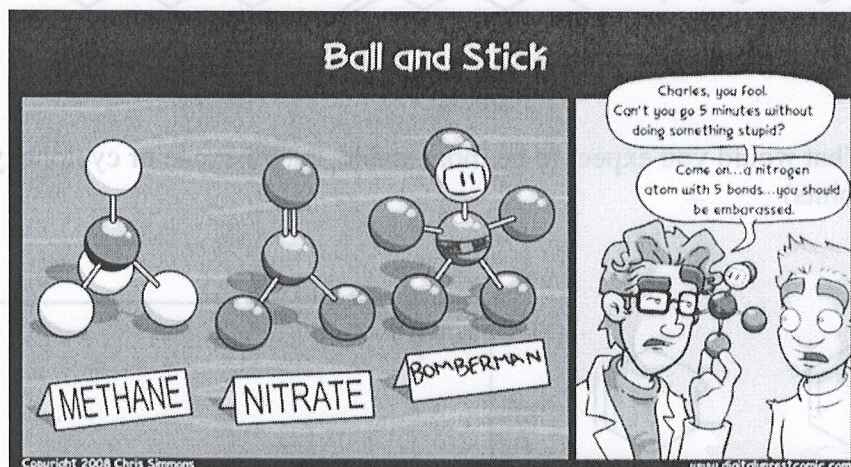
Instructions

1. Keep the exam closed until you are instructed to begin.
2. The exam consists of 5 questions. The first thing you should do is make sure that no pages are missing. If a page is missing, notify a proctor immediately.
3. You will have 1 hr and 15 minutes to complete the exam, at which time pencils must be put down. Budget your time wisely.
4. Make sure to show all of your work, and make it clear what your thought process was. Answers should fit in the space provided. If you need to use the back of the sheet of paper, you must make note of it in the space allotted for credit.

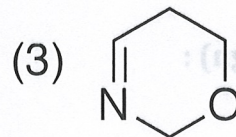
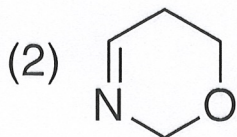
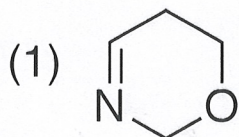
**Breakdown**

1. \_\_\_ / 12
2. \_\_\_ / 8
3. \_\_\_ / 8
4. \_\_\_ / 16
5. \_\_\_ / 12
6. \_\_\_ / 12
7. \_\_\_ / 12
8. \_\_\_ / 12
8. \_\_\_ / 8

total \_\_\_ / 100

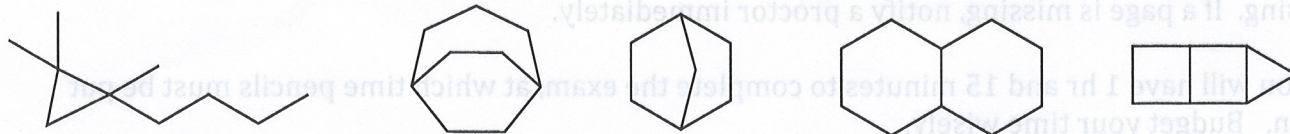


1) Show all the (1) hydrogens, (2) lone-pairs, and (3) carbons that are not shown in the following line-angle. Use the associated structures for clarity (12 points, 4 points each)



2. Circle the structure that is most consistent with the IUPAC name given (8 points, 4 points each)

2a. bicyclo[2.2.1]heptane



2b. (Z)-4,4-dimethylhept-2-ene

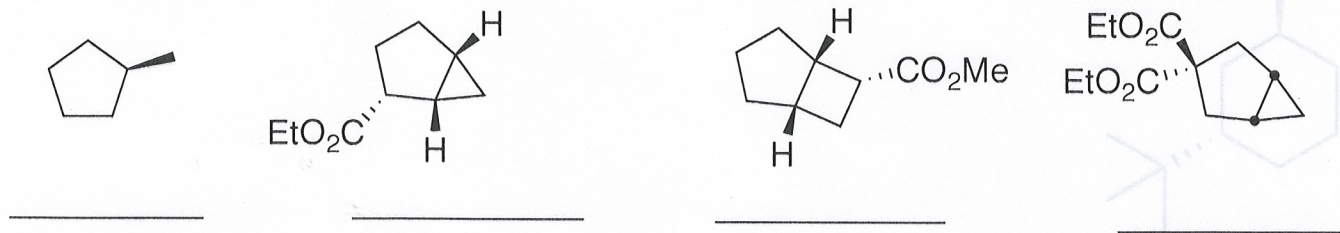


3. What would you expect to be more stable, cyclohexene or cyclohexyne? BRIEFLY Explain why? (8 points)

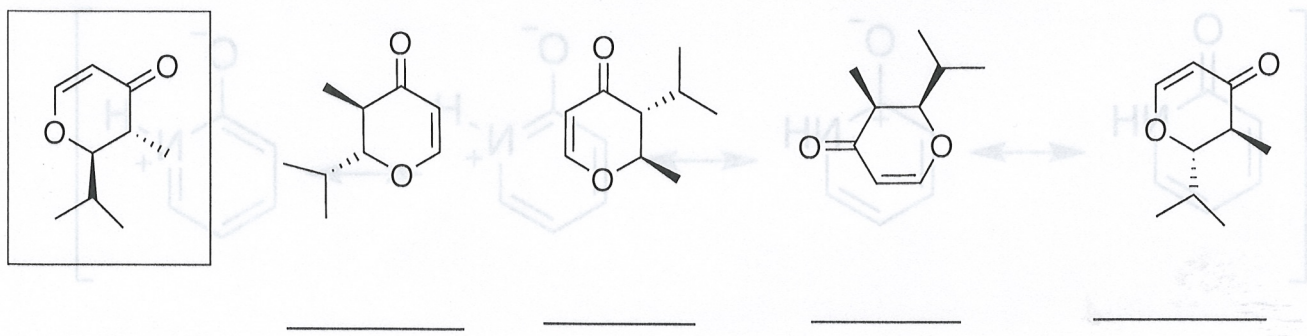


why?

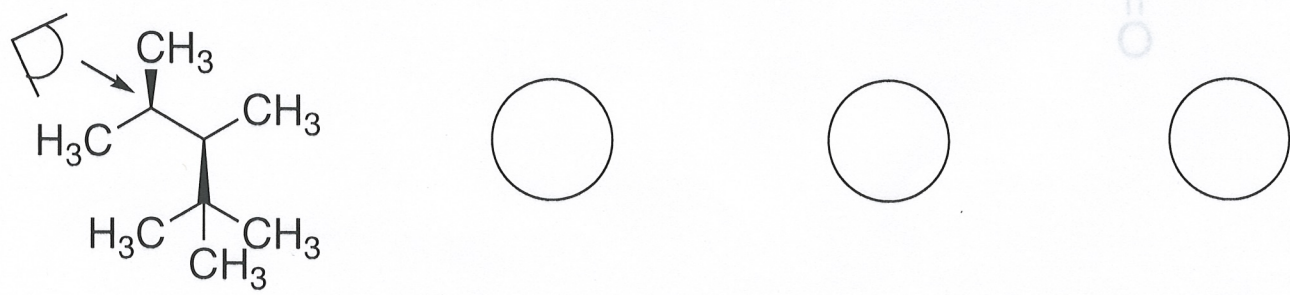
4) For the following molecules (1) circle all the stereogenic centers, and (2) label the molecules as chiral or achiral (16 points, 4 points each)



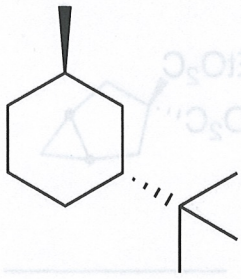
5) What is the relationship between the following molecules to the one in the box. Your options are constitutional isomers (C), diastereomers (D), enantiomers (E), or identical (I) (12 points, 3 points each)



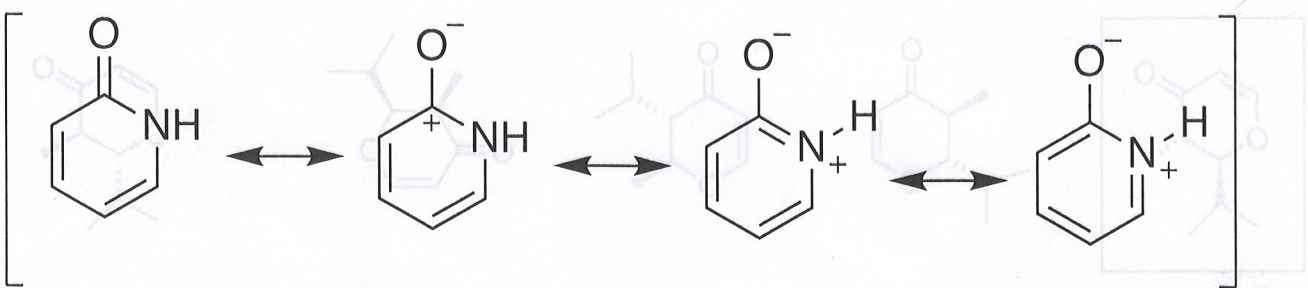
6) Draw the following molecule in its 3 staggered Newman projections using the projection provided. **Circle** the one that is **lowest in energy** and a **square** around the one **highest in energy** (12 points)



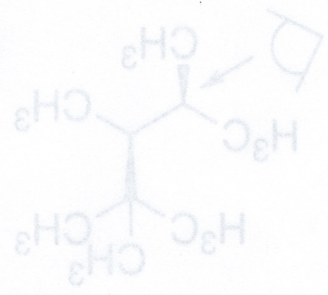
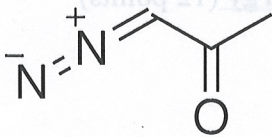
7) Draw both chair conformations of the following molecule, and circle the one that is lower in energy (12 points)



8) Show the electron arrow pushing for the following resonance interconversions, going left to right (12 points, 4 points each)



9) Find a resonance form of the following molecule that you would suspect would be a greater contributor to the hybrid. Show the electrons arrow pushing mechanism that gets you there. (8 points)



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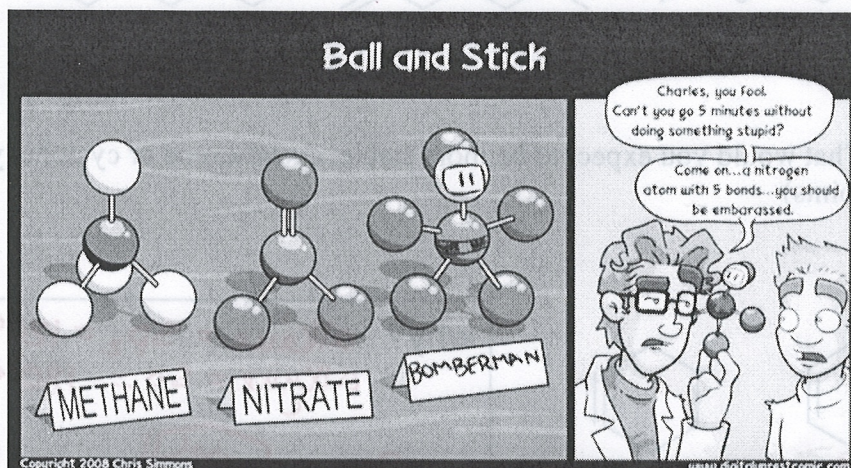
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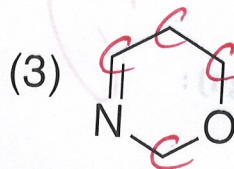
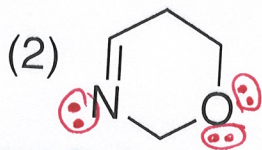
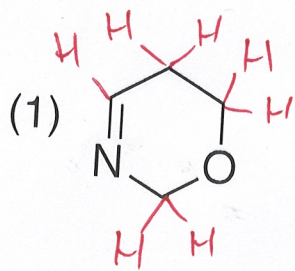
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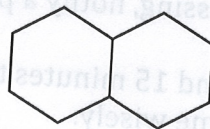
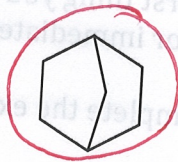
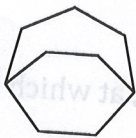
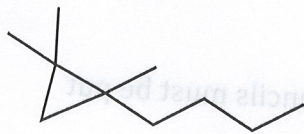


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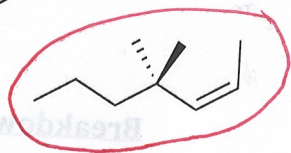
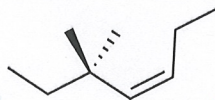
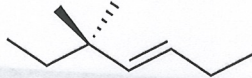
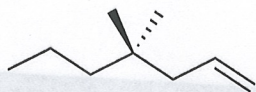
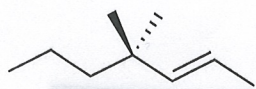


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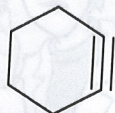
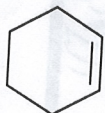
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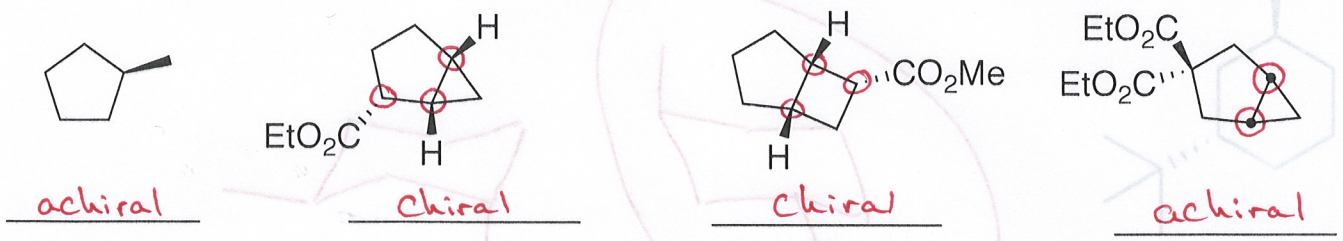


more stable

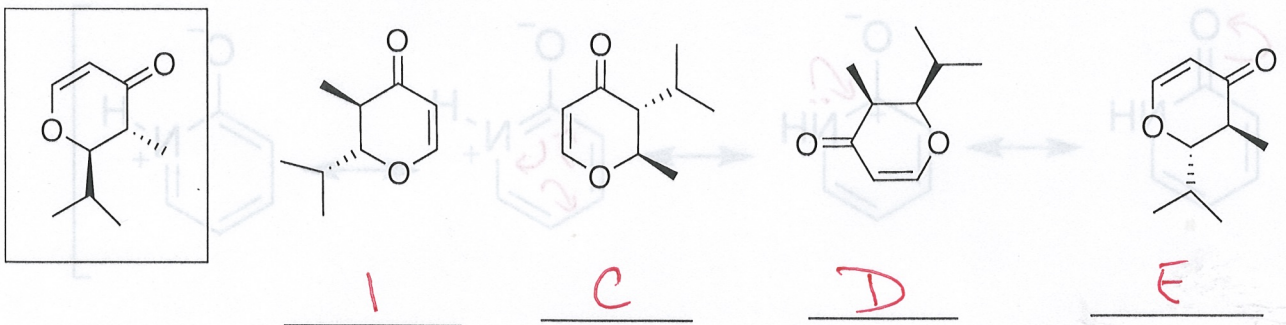
why? alkene =  $sp^2 = 120^\circ$  - closer to desired angle  
 alkyne =  $sp = 180^\circ$  - far away from desired angle

fits great too much strain

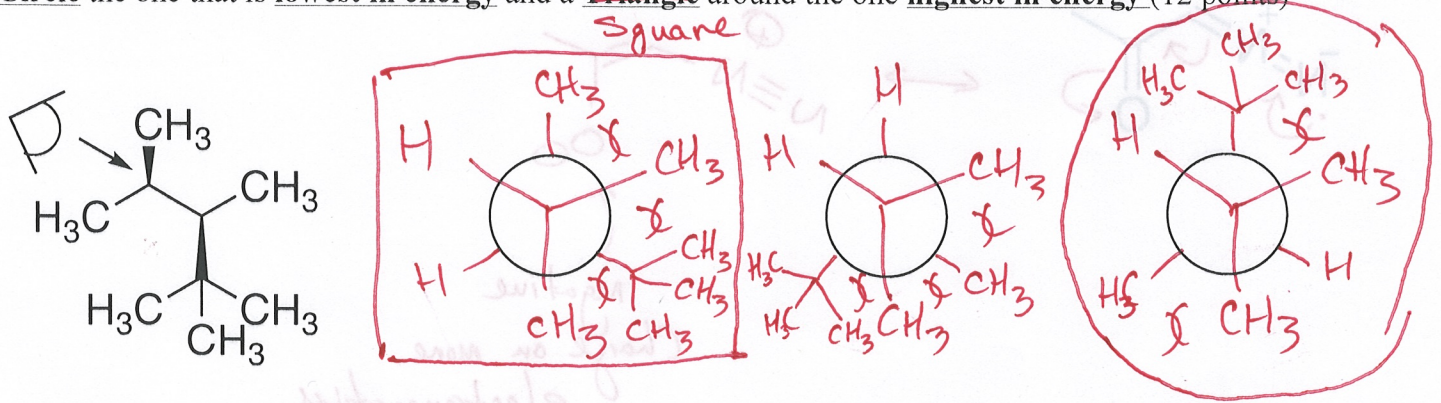
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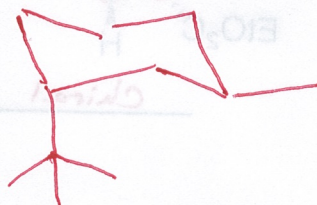
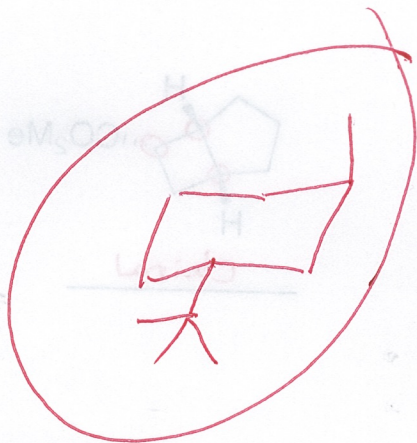
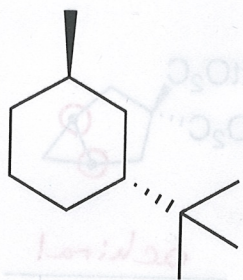
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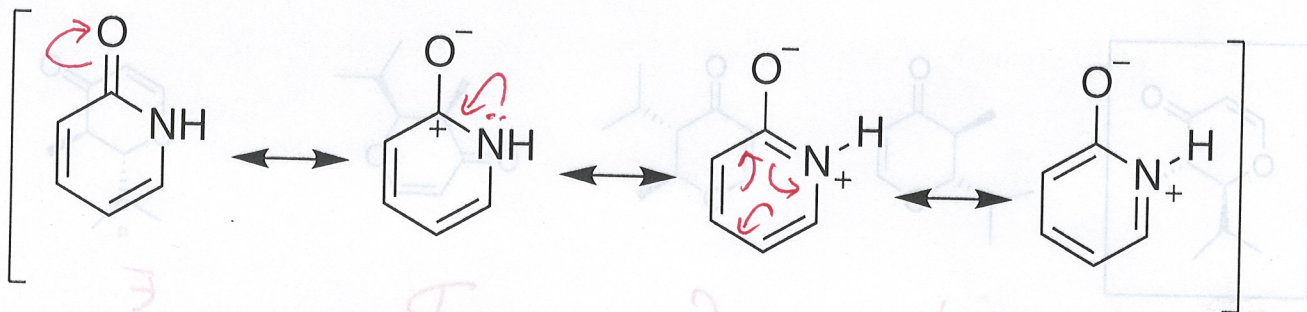
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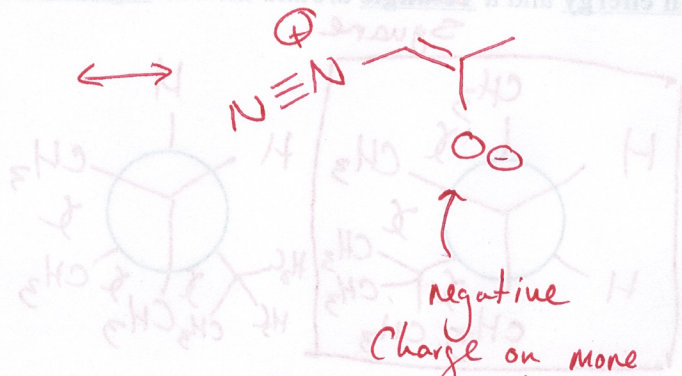
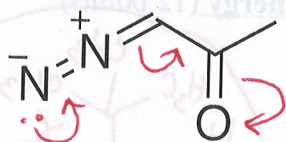
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negative charge on more electronegative oxygen