approximate grade

breakdown

~A (~75+)

>90 - 6

80-90 - 12

~B 75-60

70-80 - 37

60-70 - 43

C [50-60 - 35

D [40-50 - 35

F [30-40 - 28

<30 - 13

high - 95

Ave - 56

Median - 58

**Fall Semester 2013**
Organic Chemistry I
Midterm Examination #1

Name (print): Key

Name (sign):

Recitation Instructor (name, day):

**Instructions**

1. Keep the exam closed until you are instructed to begin.

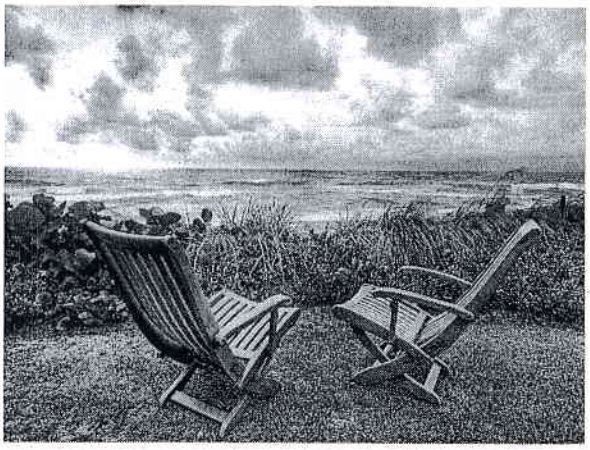
2. The exam consists of 10 questions. The first thing you should do is make sure that no pages are missing. If a page is missing, notify a proctor immediately

3. You will have 1 hour and 15 minutes. Questions are labeled from easy (*) to hard(***). Budget your time wisely.

4. Make sure to show all of your work, and this should fit into the space provided. If you need to use the back of the paper, you must make note of it in the space provided for credit.

*Good Luck!*

1. ___ *(5 points)*
2. ___ *(5 points)*
3. ___*(10 points)*
4. ___*(10 points)*
5. ___*(10 points)*
6. ___*(10 points)*
7. ___*(10 points)*
8. ___*(10 points)*
9. ___*(20 points)*
10. ___*(10 points)*



148NE

# Periodic Table of the Elements

## Ground State Electron Configurations



| 1A | 2A | 3B | 4B | 5B | 6B | 7B | 8B | | | 1B | 2B | 3A | 4A | 5A | 6A | 7A | 8A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 H | | | | | | | | | | | | | | | | | 2 He |
| 3 Li | 4 Be | | | | | | | | | | | 5 B | 6 C | 7 N | 8 O | 9 F | 10 Ne |
| 11 Na | 12 Mg | | | | | | | | | | | 13 Al | 14 Si | 15 P | 16 S | 17 Cl | 18 Ar |
| 19 K | 20 Ca | 21 Sc | 22 Ti | 23 V | 24 Cr | 25 Mn | 26 Fe | 27 Co | 28 Ni | 29 Cu | 30 Zn | 31 Ga | 32 Ge | 33 As | 34 Se | 35 Br | 36 Kr |
| 37 Rb | 38 Sr | 39 Y | 40 Zr | 41 Nb | 42 Mo | 43 Tc | 44 Ru | 45 Rh | 46 Pd | 47 Ag | 48 Cd | 49 In | 50 Sn | 51 Sb | 52 Te | 53 I | 54 Xe |
| 55 Cs | 56 Ba | 57-71 | 72 Hf | 73 Ta | 74 W | 75 Re | 76 Os | 77 Ir | 78 Pt | 79 Au | 80 Hg | 81 Tl | 82 Pb | 83 Bi | 84 Po | 85 At | 86 Rn |
| 87 Fr | 88 Ra | 89-103 | 104 Rf | 105 Db | 106 Sg | 107 Bh | 108 Hs | 109 Mt | 110 Ds | 111 Rg | 112 Cn | 113 Uut | 114 Fl | 115 Uup | 116 Lv | 117 Uus | 118 Uuo |

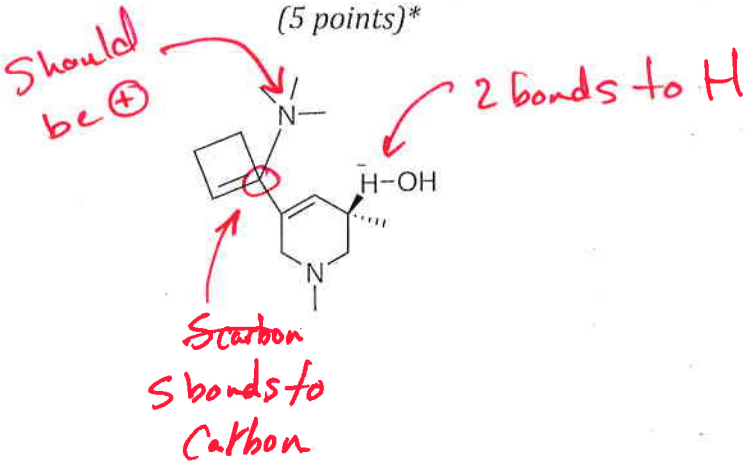
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lanthanides | 57 La | 58 Ce | 59 Pr | 60 Nd | 61 Pm | 62 Sm | 63 Eu | 64 Gd | 65 Tb | 66 Dy | 67 Ho | 68 Er | 69 Tm | 70 Yb | 71 Lu |
| Actinides | 89 Ac | 90 Th | 91 Pa | 92 U | 93 Np | 94 Pu | 95 Am | 96 Cm | 97 Bk | 98 Cf | 99 Es | 100 Fm | 101 Md | 102 No | 103 Lr |

* values are based on theory and are not verified

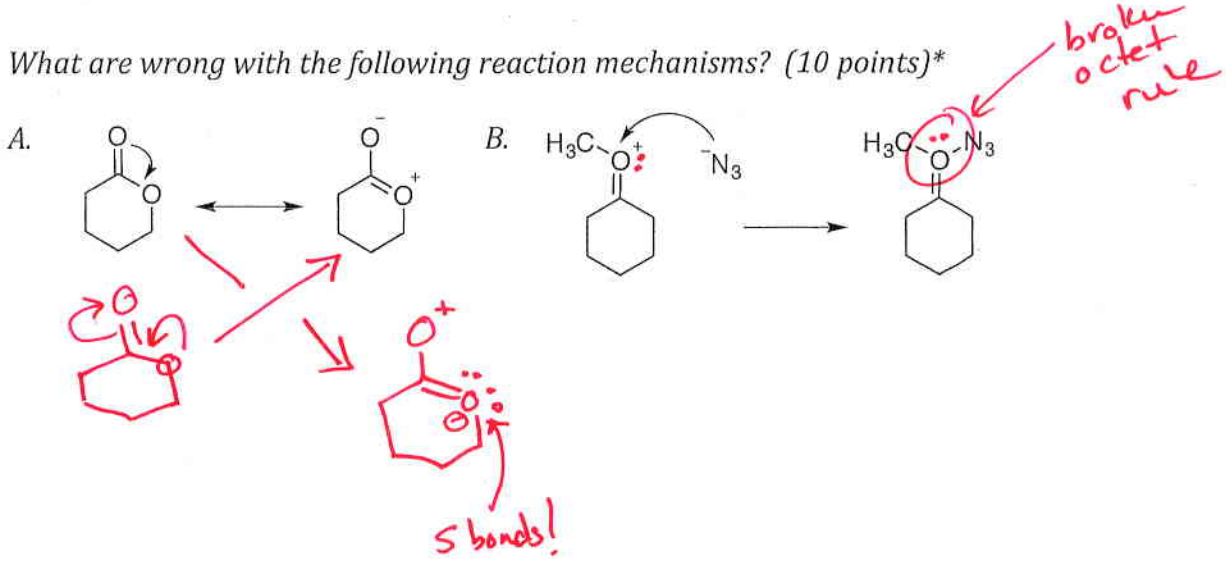
1. *Provide an IUPAC Name for the following molecule (5 points).**

3,3-dimethylpentane

2. *What is wrong with the following molecule? There may be more then one thing (5 points)**

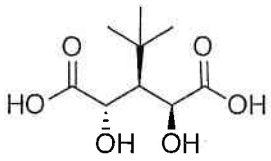



3. *What are wrong with the following reaction mechanisms? (10 points)**



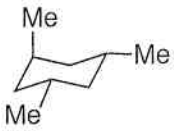
4. *Is the following molecule chiral or achiral, and if it is achiral is it meso? (10 points)***

A.




Chiral

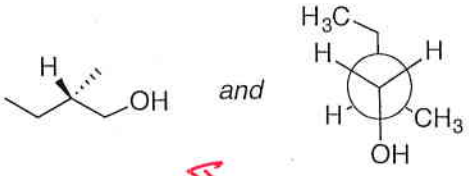
B.




achiral
no stereocenters
Based on what we know

5. *Are the following molecules enantiomers, diastereomers, or identical?***

a. *(5 points)*



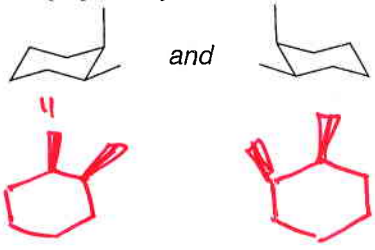

=



mirror images

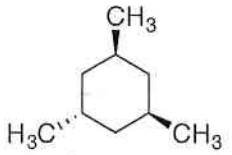
enantiomers

b. *(5 points)*

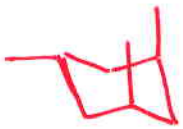



Same cmpd

6. *Draw both chair conformations of the following molecule, and circle the one that is lower in energy. (10 points)***



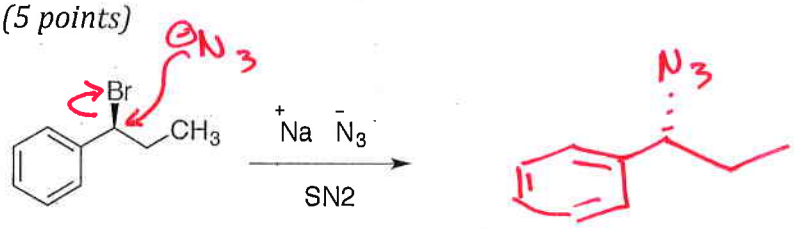




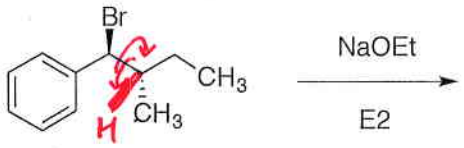

higher in energy

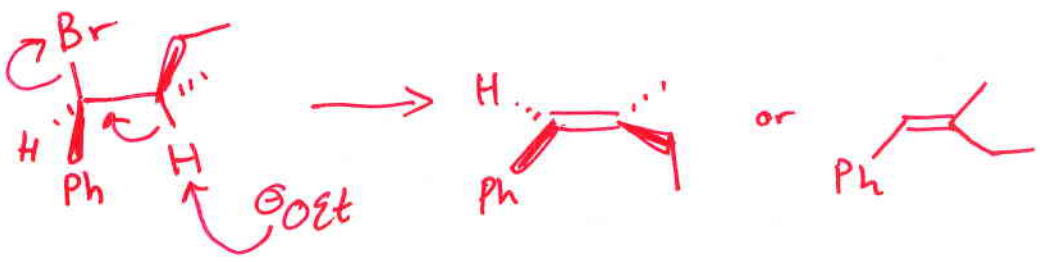
7. *Predict the product of the following reaction and show a mechanism.***

a. *(5 points)*



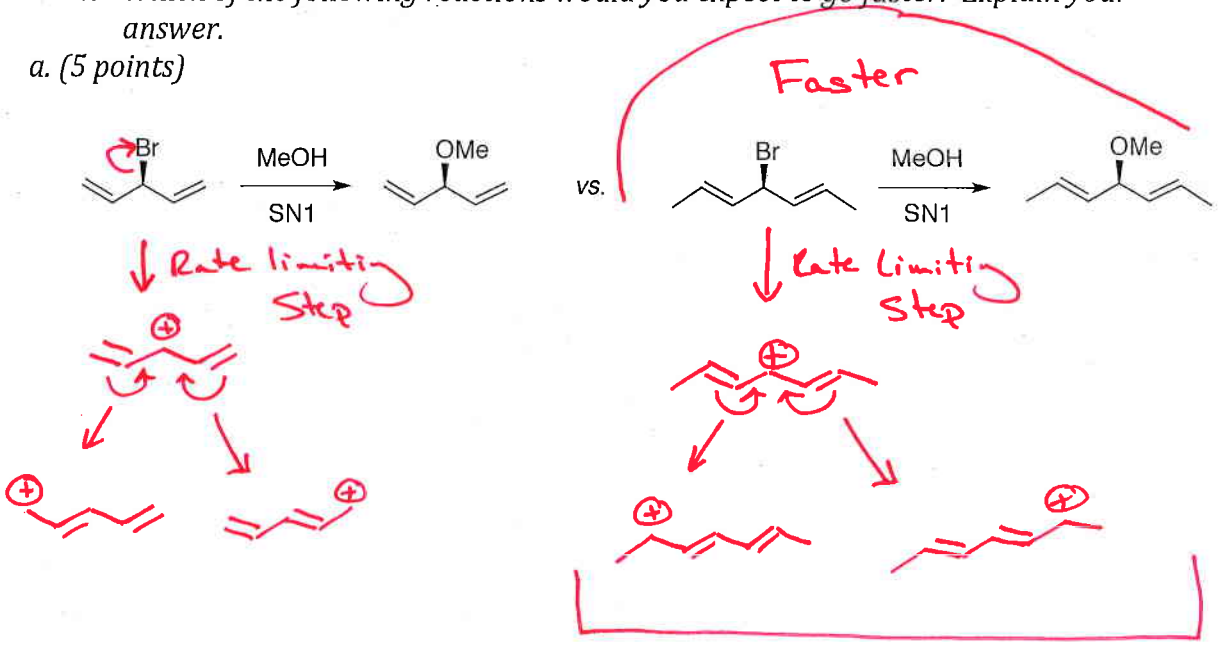

b. *(5 points)*



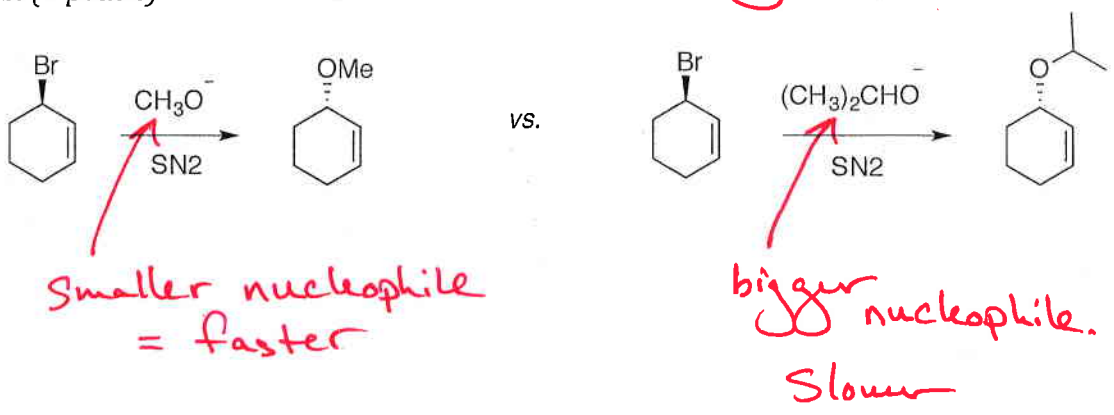



8. *Which of the following reactions would you expect to go faster. Explain your answer.*

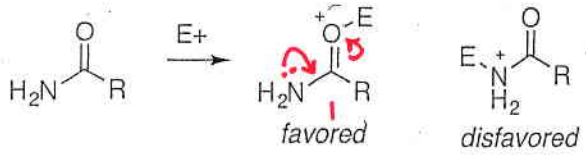
*a. (5 points)*



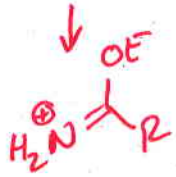

*b. (5 points)*



9. *Explain why the oxygen of an amide is more nucleophilic then the nitrogen. (10 points)**.*

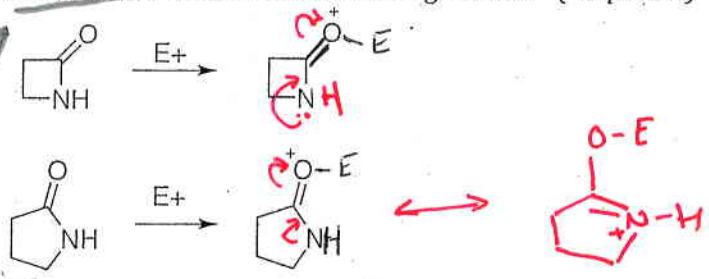



← no resonance stabilization

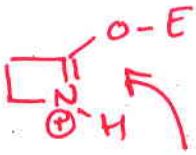


resonance Stabilization

9b. *Why might you expect the oxygen of a 4-member ring lactam to be less lewis acidic then a 5 member ring lactam? (10 points)****




Lewis Basic Typo - I graded this question generously.



greater ring Strain than in "~~cyclopentyl~~" 5 membered ring

The resonance form goes to cmpd w/ double bond in ring. ~~This increased~~

#A1

10. *The following is a reaction called a Ritter reaction. Using what you have learned to date (Acid/Base, Resonance forms, Substitution, Elimination) propose a reasonable mechanism (10 points)****