

Seat No. _____

Name _____

(Please **CLEARLY PRINT** your name and **CIRCLE** your last name)

CHEMISTRY 331

Sections A & B

EXAM III

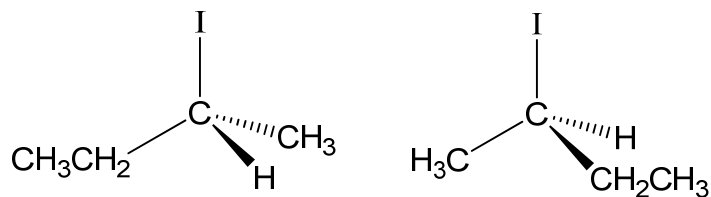
Tuesday, November 3, 2009

- I. (8 points) _____
- II. (8 points) _____
- III. (18 points) _____
- IV. (15 points) _____
- V. (10 points) _____
- VI. (4 points) _____
- VII. (10 points) _____
- VIII. (16 points) _____
- IX. (10 points) _____
- X. (1 point) _____

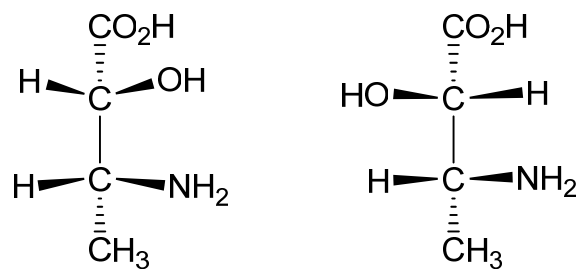
TOTAL(100 points) _____

II. (8 pts.) Provide the stereochemical relationship of each of the following pairs.

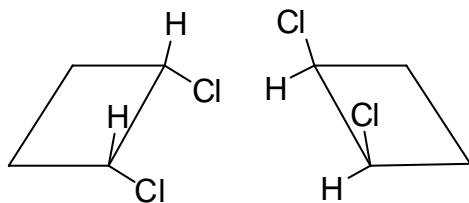
A)



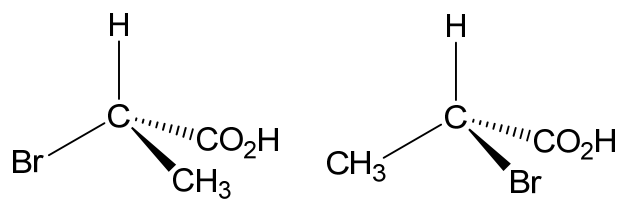
B)



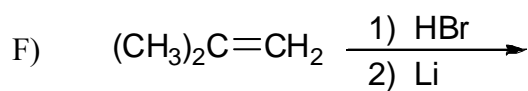
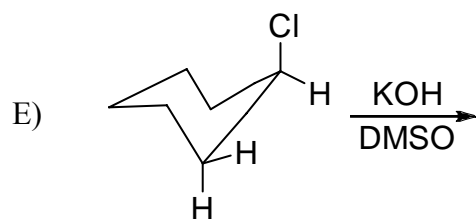
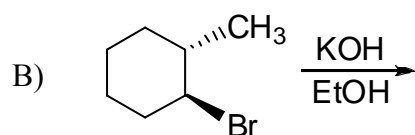
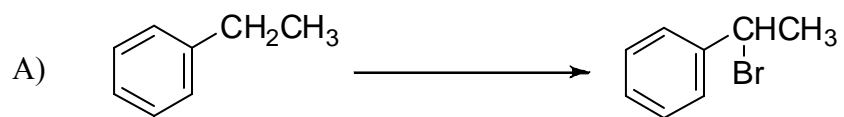
C)



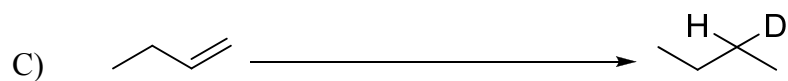
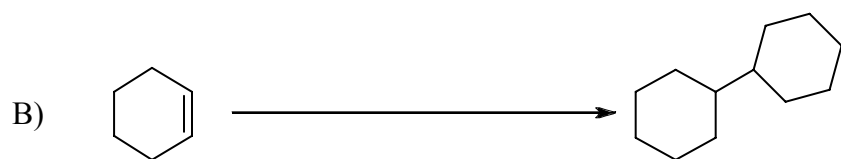
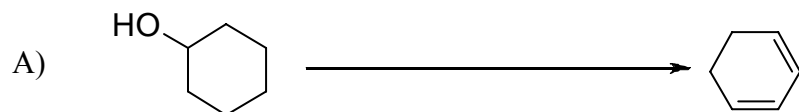
D)



III. (18 pts.) Complete the following equations.

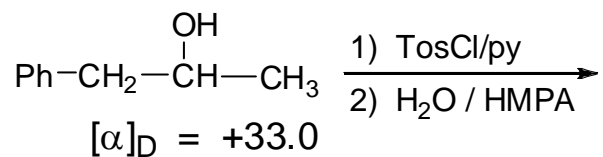


IV. (15 pts.) Show how you would perform the following transformations. Assume that all necessary inorganic reagents are available. Any necessary organometallic reagents must be constructed from the starting organic compound.



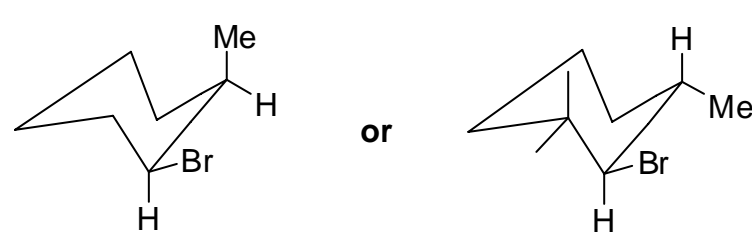
- V. (10 pts.) Provide a detailed, stepwise mechanism showing any necessary e-pair movement and any pertinent stereochemistry of the S_N^2 reaction of (S)-2-iodobutane and sodium acetate (Na^+OAc) in DMF.

- VI. (4 pts.) Provide the alcohol product and its anticipated $[\alpha]_D$ of this reaction sequence.



- VII. (10 pts.) 2R-2-butanol slowly racemizes in dilute H_2SO_4 . Write a mechanism for this process.

VIII. (16 pts) **Circle** the one which

- A) is most nucleophilic HO^- or HS^-
- B) is better S_{N}^2 solvent CH_3OH or $\text{Me}-\overset{\text{O}}{\parallel}{\text{S}}-\text{Me}$
- C) most likely to undergo an S_{N}^1 reaction $\text{CH}_3\overset{\text{OTos}}{\text{C}}\text{HCH}_3$ or $(\text{CH}_3)_3\text{COTos}$
- D) would undergo an E_2 elimination faster $\text{Ph}-\text{CH}_2\text{CH}_2\text{Br}$ or $\text{PhCD}_2\text{CH}_2\text{Br}$
- E) would undergo an E_2 elimination to give 1-methylcyclohexene
- 
- F) would undergo inversion of configuration $\text{Et}\overset{\text{OH}}{\underset{*}{\text{C}}}\text{HCH}_3 \xrightarrow[\text{py}]{\text{SOCl}_2}$ or $\text{Et}\overset{\text{OH}}{\underset{*}{\text{C}}}\text{HCH}_3 \xrightarrow{\text{ClTos}}$
- G) would be the less likely to act as a nuc. In an S_{N}^2 reaction $\text{CH}_3\text{CH}_2\text{O}^- \text{Na}^+$ or $(\text{CH}_3)_3\text{CO}^- \text{Na}^+$
- H) would be the best leaving group For an S_{N}^1 reaction $\text{Me}-\text{C}_6\text{H}_4-\text{SO}_3^-$ or HO^-

IX. (10 pts) Draw (3R, 2S)-2-iodo-3-phenylbutane using wedge / dotted line 3D drawings and draw and name the major alkene product that will be produced from E₂ elimination of HI.

X. (1 pt.) For one point work one of the following problems:

A) Who was buried in Grant's Tomb?

B) Why is the person who invests your money called a "broker"?

C) What disease did cured ham actually have?

D) Can a hearse carrying a corpse legally drive in the car pool lane?