Organic Chemistry
EXAM

Second -4

Solved by: -

Corrected by: -

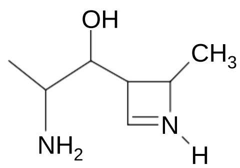
Chemistry Department

May 9, 2009 **Organic Chemistry 233** **Midterm(60 min.)**

Name:…………xxxxxxxxxxxxxxx……………..……Registration No.:……………

I. Circle the correct answer in each of the following: (10 pts)

- The number of stereogenic centers in the molecule below is:



a. 1 b. 2 c. 3 d. 4 e. 5

- The number of possible stereoisomers of:

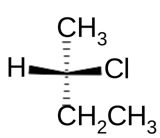
$HO_2C—CH_2—CH(Cl)—CH(Cl)—CH_2—CO_2H$

a. 1 b. 2 c. 3 d. 4 e. 5

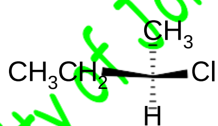
- The observed α rotation for 100 mL of an aqueous solution of 1.0 g of sucrose in 20 cm sample tube is +1.33. The specific rotation [α] is:

a. +66.5 º b. +26 º c. +41.5 º d. +133 º e. -26 º

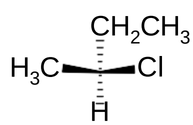
- Which of the following molecules are **the same**:



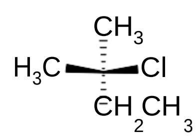
1



2



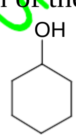
3

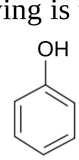


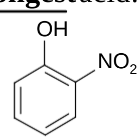
4

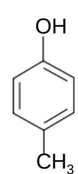
a. 1 and 2 b. 3 and 4 c. 1 and 3 d. 2 and 3 e. 2 and 4

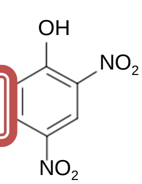
- Which of the following is the **strongest** acid:

a. 

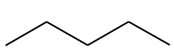
b. 

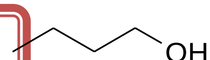
c. 

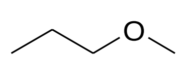
d. 

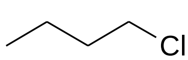
e. 

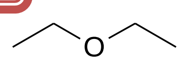
- Which of the compounds listed below would you expect to have the **highest** boiling point?

a. 

b. 

c. 

d. 

e. 

- Which of the following is the best method to prepare isopropyl methyl ether:

  a. $CH_3OH + (CH_3)_2CHOH + H_2SO_4$, 140 °C

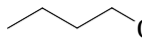
  b. $CH_3OH + (CH_3)_2CHCH_2OH + H_2SO_4$, 140 °C

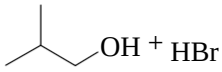
  c. $CH_3ONa + (CH_3)_2CHBr$

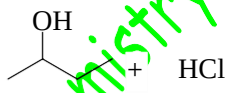
  d. $CH_3ONa + (CH_3)_2CHCH_2Br$

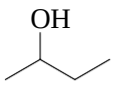
  e. $CH_3I + (CH_3)_2CHONa$

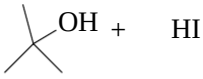
- Which of the following synthetic methods of alkyl halide is expected to occur at fastest rate?

a.  + HI

b.  + HBr

c.  + HCl

d.  + HBr

e.  + HI

- Which one of the following is the **strongest nucleophile:**

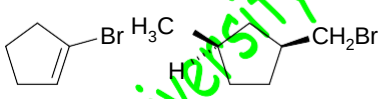
  a. $CH_3O\ Na$ in CH_3OH b. NaOH in H_2O c. NaCN in Acetone

  d. NaCN in H_2O e. CH_3OH in H_2O

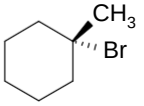
- Which of the following reactions proceeds with inversion of configuration at the carbon bearing the leaving group?

  a) S_N2 b) S_N1 c) E2 d) E1 e) All of them

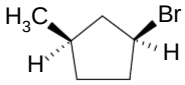
II. Given the following alkyl halides:(4 points)



A B



C



D

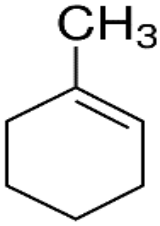
1. The ~~most~~ reactive alkyl halide with $NaOCH_3$……C…….

2. The compound that produces a pair of diastereomers when reacted with CH_3OH…D

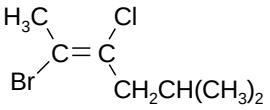
3. The **least** reactive alkyl halide towards nucleophilic substitution……A……

4. Draw the structure of the **major** product obtained when heating C with NaOH

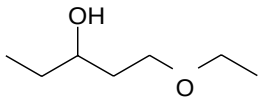
An E2 reaction happens and the product is:



III. Give the correct IUPAC names for each of the following compounds:(4 poins)

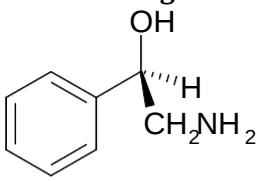


2-bromo-3-chloro-5-methyl-2-hexen



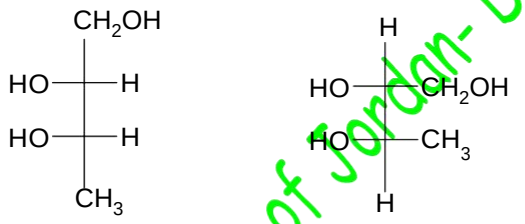
5-ethoxy-3-pentanol

IV. The configuration of the indicated stereogenic center is:(2 points)



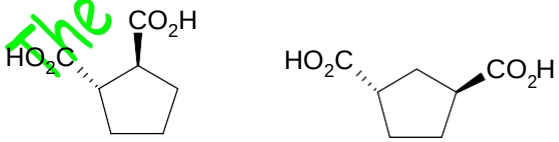
R (rectus)

V. Label the following pairs of isomers as enantiomers, diastereomers, conformational, constitutional or identical :(8 points)

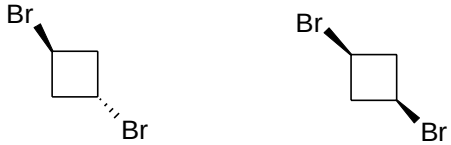


Enantiomers

Enantiomers



Constituationals



Conformationals

VI. Complete the following reactions giving the major products:(22 points)