

May 9, 2009

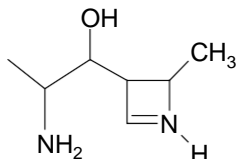
Chemistry Department  
Organic Chemistry 233

Midterm(60 min.)

Name:.....XXXXXXXXXXXXXXXX.....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:

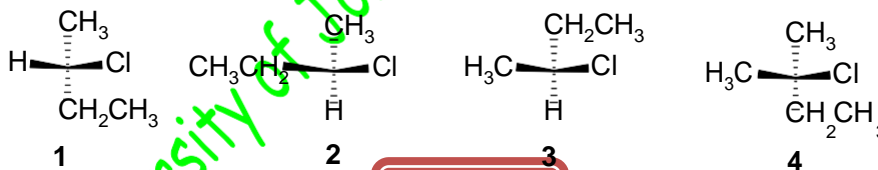


- a. 1      b. 2      **c. 3**      d. 4      e. 5

➤ The observed  $\alpha$  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  $[\alpha]$  is:

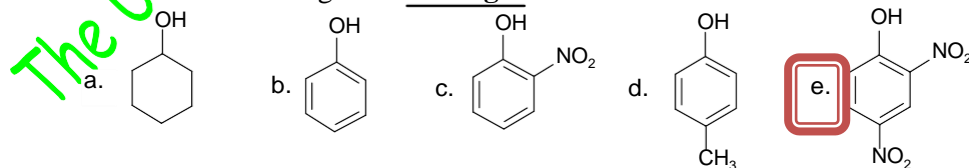
- a. +66.5°**      b. +26°      c. +41.5°      d. +133°      e. -26°

➤ Which of the following molecules are the same:

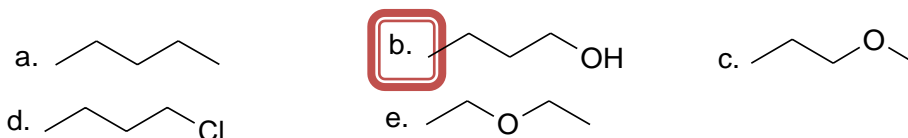


- a. 1 and 2      b. 3 and 4      **c. 1 and 3**      d. 2 and 3      e. 2 and 4

➤ Which of the following is the strongest acid:



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

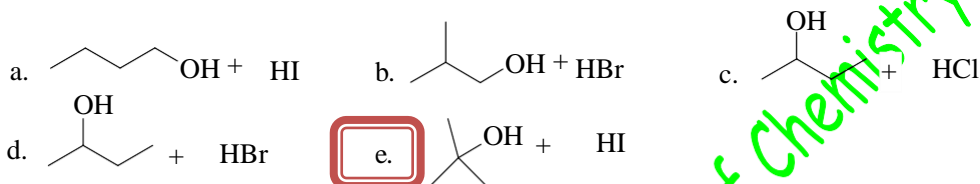


➤ Which of the following is the best method to prepare isopropyl methyl ether:

- a.  $\text{CH}_3\text{OH} + (\text{CH}_3)_2\text{CHOH} + \text{H}_2\text{SO}_4, 140\text{ }^\circ\text{C}$
- b.  $\text{CH}_3\text{OH} + (\text{CH}_3)_2\text{CHCH}_2\text{OH} + \text{H}_2\text{SO}_4, 140\text{ }^\circ\text{C}$
- c.  $\text{CH}_3\text{ONa} + (\text{CH}_3)_2\text{CHBr}$
- d.  $\text{CH}_3\text{ONa} + (\text{CH}_3)_2\text{CHCH}_2\text{Br}$

**e.  $\text{CH}_3\text{I} + (\text{CH}_3)_2\text{CHONa}$**

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



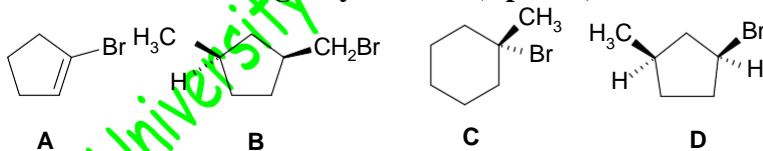
➤ Which one of the following is the **strongest nucleophile**:

- a.  $\text{CH}_3\text{O}^- \text{Na}^+$  in  $\text{CH}_3\text{OH}$
- b.  $\text{NaOH}$  in  $\text{H}_2\text{O}$
- c.  $\text{NaCN}$  in Acetone**
- d.  $\text{NaCN}$  in  $\text{H}_2\text{O}$
- e.  $\text{CH}_3\text{OH}$  in  $\text{H}_2\text{O}$

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

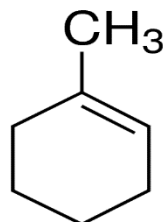
- a)  $\text{S}_\text{N}2$**
- b)  $\text{S}_\text{N}1$
- c) E2
- d) E1
- e) All of them

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

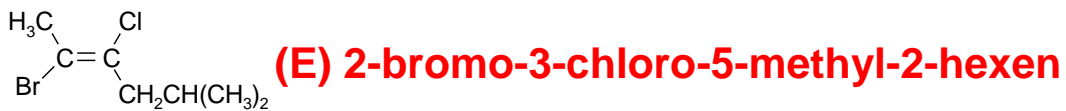


1. The **most** reactive alkyl halide with  $\text{NaOCH}_3$ ..... **C**.....
2. The compound that produces a pair of diastereomers when reacted with  $\text{CH}_3\text{OH}$ ... **D**
3. The **least** reactive alkyl halide towards nucleophilic substitution..... **A**.....
4. Draw the structure of the **major** product obtained when heating C with  $\text{NaOH}$

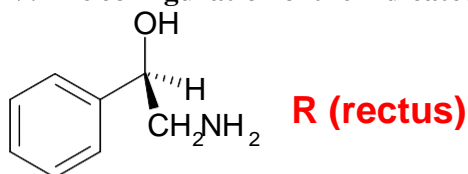
**An E2 reaction happens and the product is:**



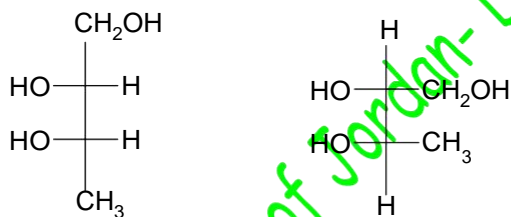
III. Give the correct IUPAC names for each of the following compounds:(4 points)



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



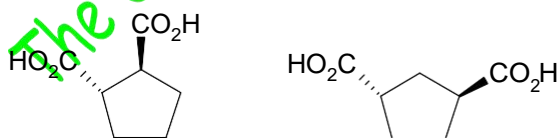
V. Label the following pairs of isomers as enantiomers, diastereomers, conformational, constitutional or identical :(8 points)



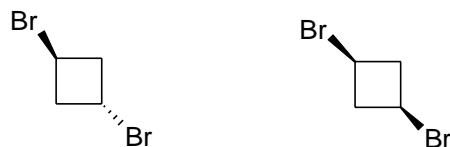
**Enantiomers**



**Identical**



**Constitutionals**



**Diastereomers**

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

