

CHEMISTRY 2210 - PRACTICE EXAM #3 (KATZ)

Section 1 - Match the phrases with the correct term from the list at the bottom of the page. Place the letter of the correct term in the blank next to the phrase or definition. (Definitions may be used more than once.)

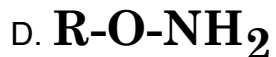
- _____ 1. Molecules which are **nonsuperimposable mirror images of each other**
- _____ 2. Stereoisomers which **are not** mirror images of each other
- _____ 3. The instrument used to demonstrate optical activity
- _____ 4. The name for the major type of chemical reaction involved in **digestion**
- _____ 5. The major storage form of digestible carbohydrates in plants
- _____ 6. Movement of a solute across a membrane **which requires** input of energy
- _____ 7. A polymer of glucose unit linked by β linkages which is **not digestible for man**
- _____ 8. The only physical difference between enantiomers
- _____ 9. Molecules which have both hydrophobic and hydrophilic portions
- _____ 10. The relationship between D-glucose and L-glucose
- _____ 11. A linear chain of thousands of glucose monosaccharides linked by α -1,4 linkages
- _____ 12. The major storage form of carbohydrates in animals
- _____ 13. The chemical process which converts unsaturated oils to saturated fats
- _____ 14. A branched chain of thousands of glucose monosaccharides linked by both α -1,4 and α -1,6 linkages
- _____ 15. Movement of a solute across a membrane **which does not require** input of energy
- _____ 16. Locally released hormones responsible for pain and inflammatory responses.

- | | | | |
|----------------|----------------------|----------------|------------------|
| A. enantiomers | B. active transport | C. polarimeter | D. amylopectin |
| E. starch | F. specific rotation | G. glycogen | H. diastereomers |
| I. cellulose | J. amphipathic | K. amylose | L. hydrogenation |
| M. hydrolysis | N. simple diffusion | O. hydration | P. eicosanoids |

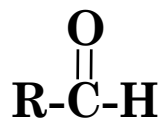
Section 2 - Multiple choice. For each question choose the best answer and place the letter of your choice in blank.

(48 pts)

_____ 1. Which of the following is a general formula for **an amine** ?



_____ 2. What family of compounds has the following general formula ?



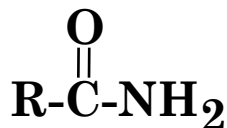
A. aldehyde

B. carboxylic acid

C. ester

D. ketone

_____ 3. Which family of compounds has the following general formula ?



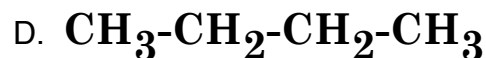
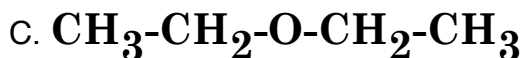
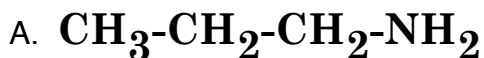
A. alcohol

B. amine

C. amide

D. ketone

_____ 4. Which of the following compounds is MOST soluble in water ?



_____ 5. Which pair of compounds is a pair of enantiomers ?

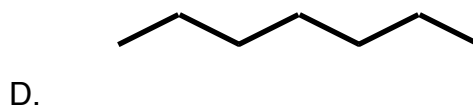
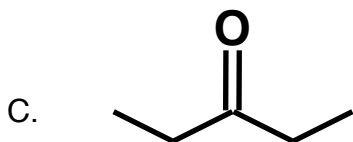
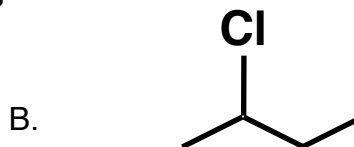
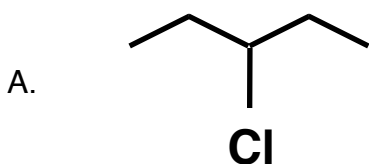
A. 1-pentanol and 2-pentanol

B. (+)-2-pentanol and (-)-2-pentanol

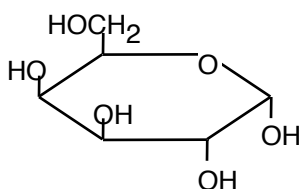
C. pentanol and isopentanol

D. 2-pentanol and 3-hexanol

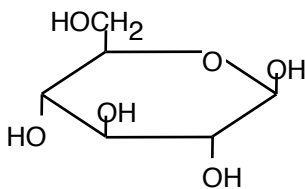
_____ 6. Which compound contains a chiral carbon ?



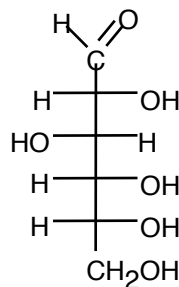
_____ 7. Which of the following structures **IS NOT** a correct representation of glucose?



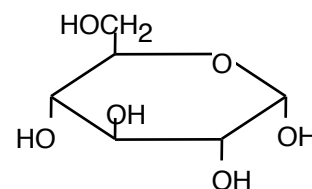
A



B

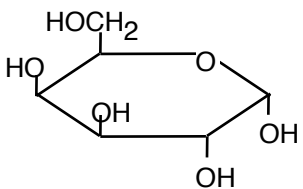


C

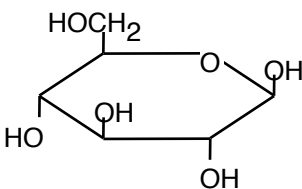


D

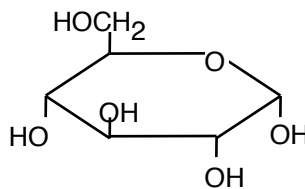
_____ 8. Which of the following represents **fructose**?



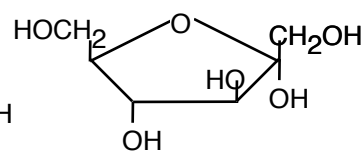
A



B

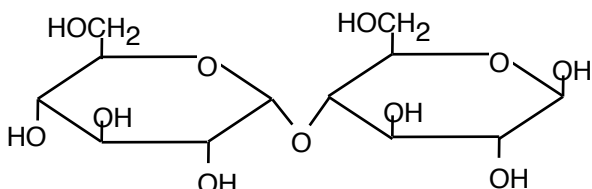


C

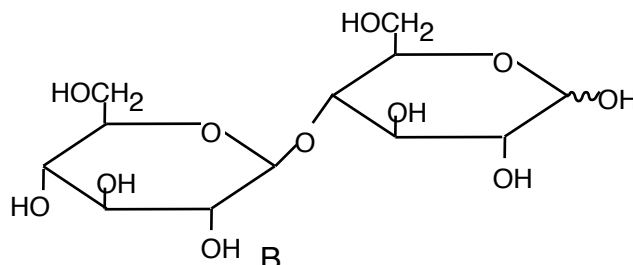


D

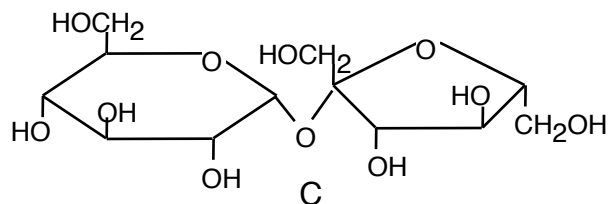
_____ 9. Which of the following is **lactose** ?



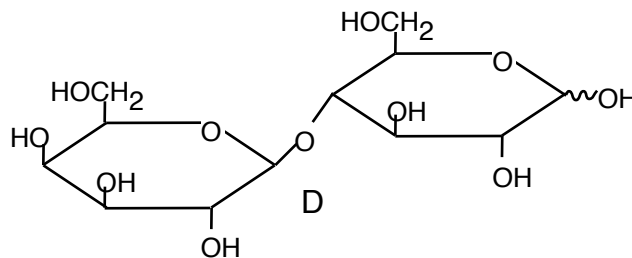
A



B



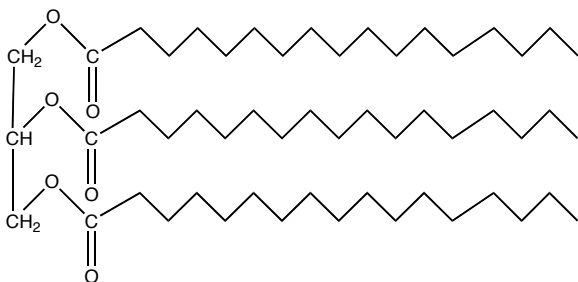
C



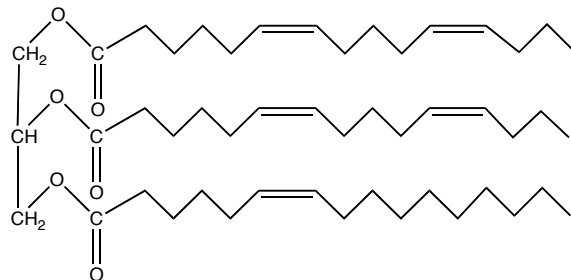
D

_____ 10. Which of the following is an **oil** ?

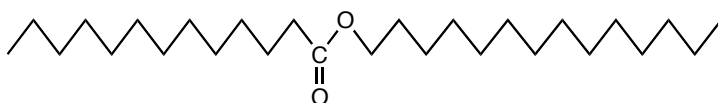
A



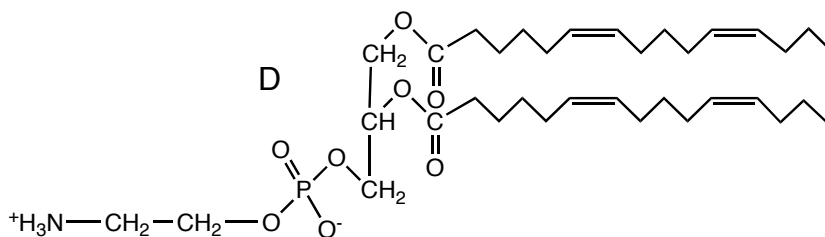
B



C



D



_____ 11. Which of the compounds in Problem #10 is classified as a wax ?

Choose A, B, C, or D

_____ 12. Which of the compounds in Problem #10 could serve as a membrane component ?

Choose A, B, C, or D

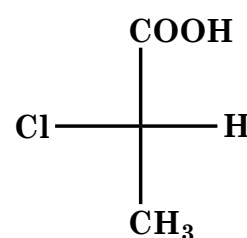
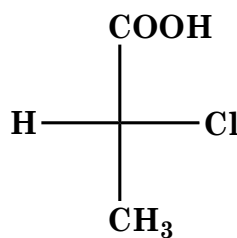
_____ 13. What is the relationship between these two compounds:

A. The compounds are identical.

B. The compounds are enantiomers.

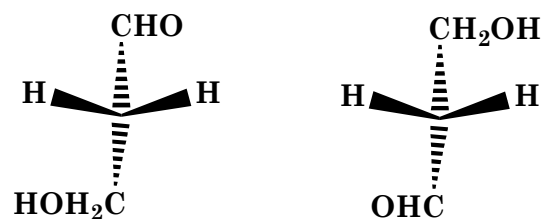
C. The compounds are diastereomers

D. The compounds are structural isomers.



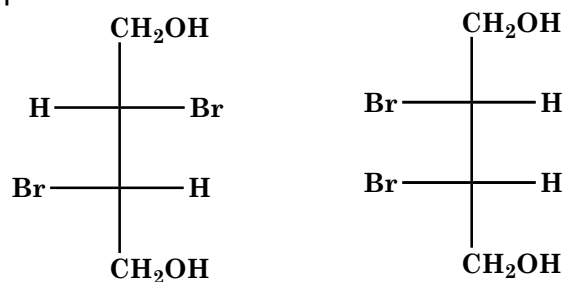
_____ 14. What is the relationship between these two compounds:

- A. The compounds are identical.
- B. The compounds are enantiomers.
- C. The compounds are diastereomers
- D. The compounds are structural isomers

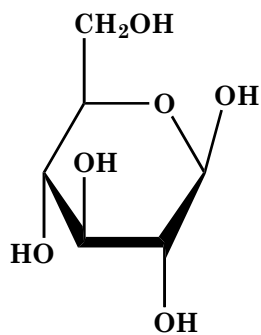


_____ 15. What is the relationship between these two compounds:

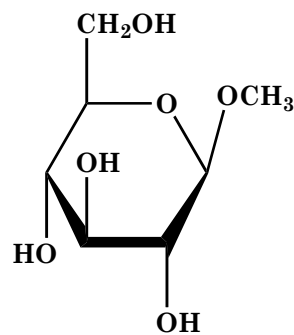
- A. The compounds are identical.
- B. The compounds are enantiomers.
- C. The compounds are diastereomers
- D. The compounds are structural isomers



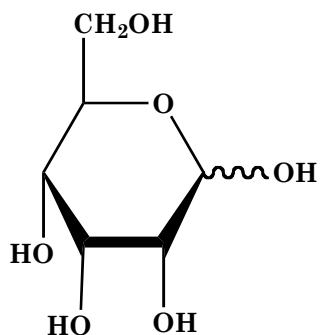
_____ 16. Which of the following **is not** a reducing sugar ?



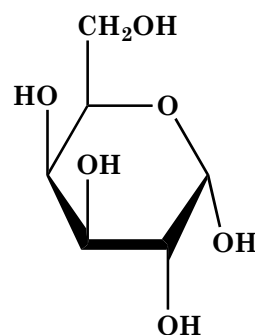
A



B



C



D

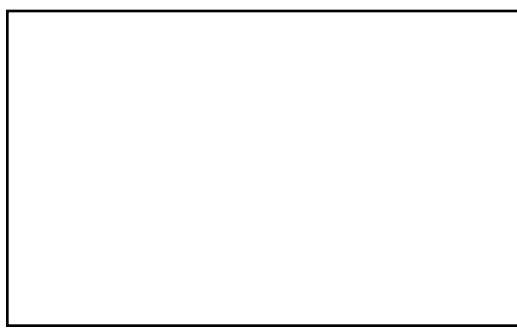
Section 3 - Questions Related to Biomolecular Structures

(25 pts)

1) Draw the structures of the following two molecules:

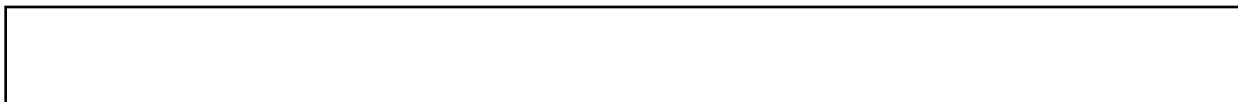
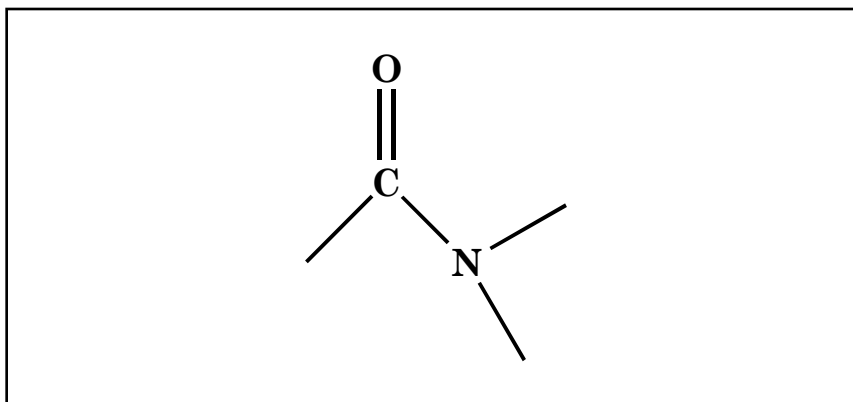


3-methyl-butanoic acid

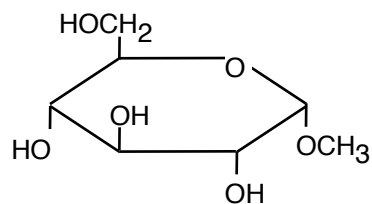
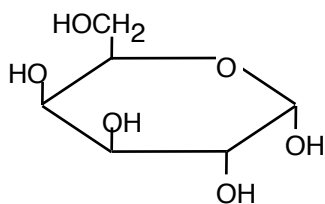


isopropyl amine

Now, complete the structure of the **amide** formed from the condensation reaction joining the two molecules and **name the molecule**.



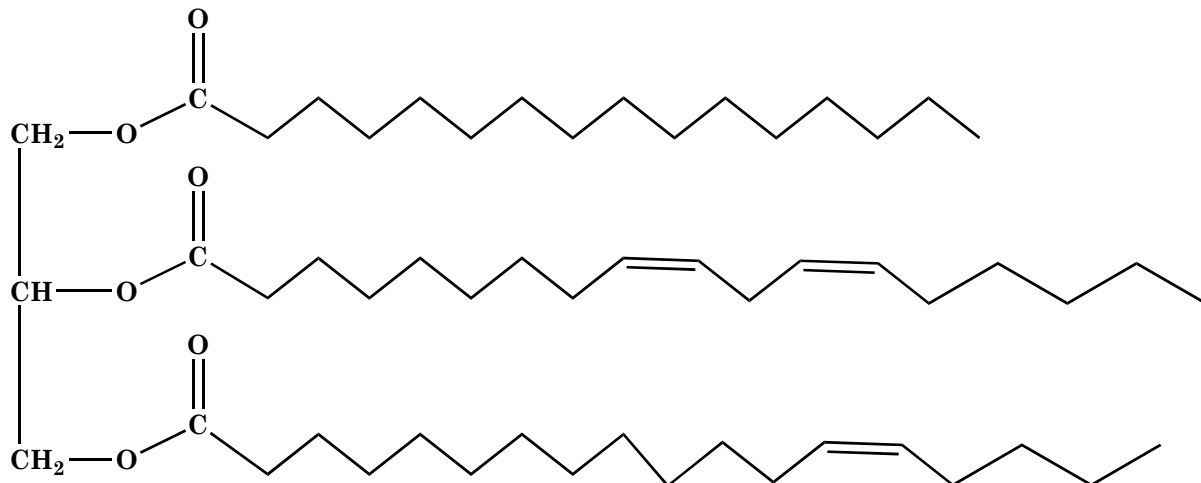
2) Consider the following two carbohydrate molecules:



Draw the structure of **any disaccharide** formed from these two molecules:



3) Consider the following lipid



a) The compound is a (circle the correct answer)

fatty acid

wax

triglyceride

- b) Draw the structures of the **four compounds** which would result from the hydrolysis of **the above** lipid molecule. (*Hint: You simply break three correct bonds and add water to the remaining fragments to obtain new molecules which do not violate bonding rules.*) The molecular formulas of the resulting four molecules are given.

