

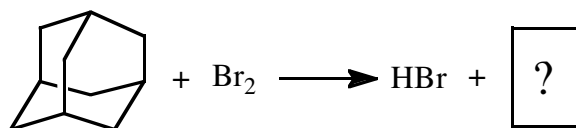
March 4, 2002
 Exam 1 (Collaborative section)
 Organic Chemistry
 NESAs – Fall 2001

Name _____

Point values are specified in parentheses. This section of the exam is open book, open notes, and collaboration is allowed.

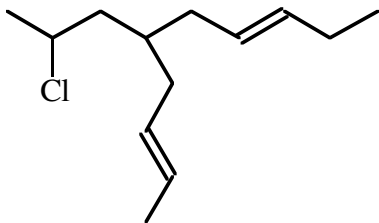
1. Write two possible compounds with the formula C_7H_{10} . (4 pts.)

2. Consider the following reaction:

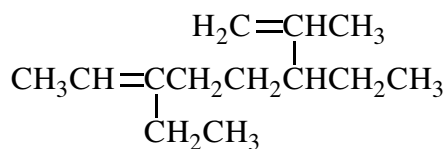


What would be the most likely product? (3 pts.)

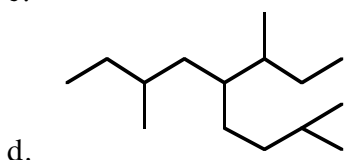
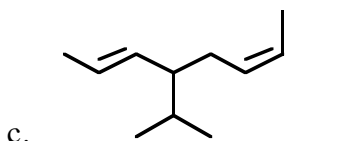
3. Name the following molecules. You may use common or systematic names for compounds and substituents. (2 pts each)



a.



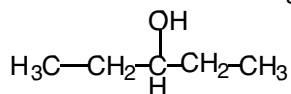
b.



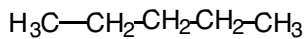
4. Predict the most probable product from the reaction: (3 pts.)



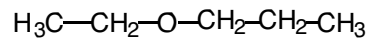
5. Consider the following compounds: (10 pts. total)



2-pentanol



pentane



ethoxypropane

- a. List the compounds in order of boiling point (highest to lowest). (2 pts.)

- b. Briefly explain your logic in answer a. (3 pts.)

- c. List the compounds as in a, but this time consider solubility in water. (2 pts.)

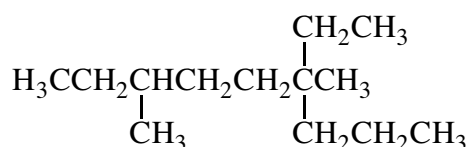
- d. Briefly explain your logic in answer c. (3 pts)

March 4, 2002
 Exam 1 (Individual section)
 Organic Chemistry
 NESAs – Fall 2001

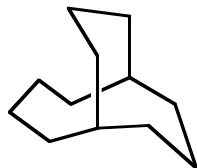
Name _____

All questions are worth two points unless specified in parentheses. This section of the exam is closed book, closed notes, and no collaboration is permitted.

Questions 1-3 refer to the molecule:

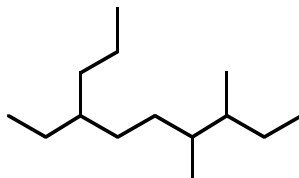


- Write a balanced chemical equation for the combustion of this molecule in the presence of oxygen? You do not have to draw the structure. Use molecular formulas. (3 pts)
- The most appropriate name for the molecule above is:
 - 3,6-dimethyl-3-(1-propyl)-octane
 - 6-ethyl-3,6-dimethylnonane
 - 2-ethyl-5-methyl-2-propylheptane
 - 2,5-diethyl-5-methyloctane
- The number of secondary (2°) carbons in the molecule above is:
 - 1
 - 2
 - 3
 - 4
- All of the following are isomers with formula C_8H_{18} **except**:
 - 2,2,4-trimethylpentane
 - 3-ethyl-hexane
 - 2,3-dimethylhexane
 - Methylcycloheptane
- The following molecule falls into the class of alkanes called bicyclo-alkanes. How many hydrogen atoms are there in the following molecule?

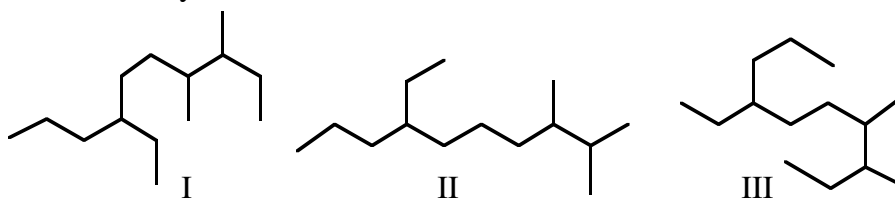


6. The shape assumed by carbon atoms in alkane molecules is called:
- octahedral
 - tetrahedral
 - pentagonal
 - pyramidal

Problems 7 – 11 refer to the following molecule:

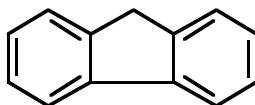


7. The IUPAC name for this molecule is:
- 3,4-dimethyl-7-propylnonane
 - 7-ethyl-3,4-dimethyldecane
 - 2,6-diethyl-3-methylnonane
 - 2-(2-butyl)-5-ethyloctane
8. Two of the following three molecules are conformational isomers of the molecule above. Which are they? Circle the answers.

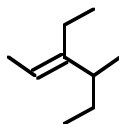


9. If the molecule above underwent free radical halogenation, how many unique monohalogenated products could be produced?
- 12
 - 13
 - 14
 - 15
10. Of the monohalogenated products, how many would be considered the major products?
- 1
 - 2
 - 3
 - 4
11. Draw one major product referred to in question 10. Represent the halogen with an **X**. (3 pts)

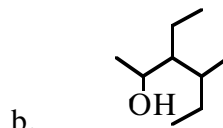
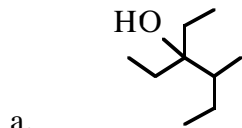
12. Write the molecular formula for the molecule depicted below:



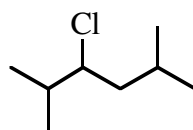
13. The dehydration of alcohols by acid is a very good way of making alkenes. Consider the alkene: (3 pts.)



Which of the following alcohols is most likely the one used to produce the alkene?

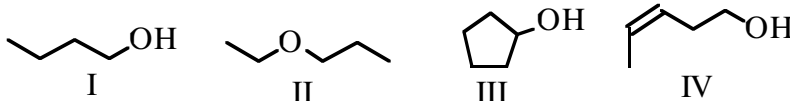


14. The following molecule can be made in several of the ways that we have discussed:



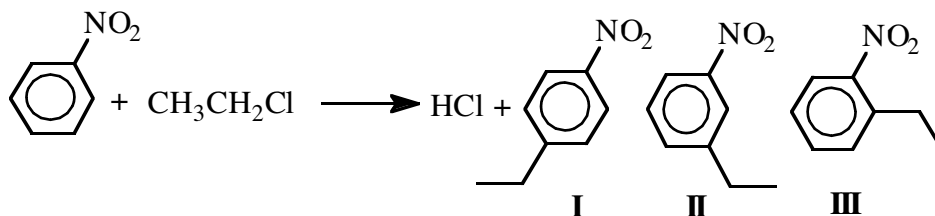
Which of the following is the **most** efficient way? (3 pts)

- a. Hydrohalogenation of 2,5-dimethyl-2-hexene with HCl.
 b. Hydrohalogenation of 2,5-dimethyl-3-hexene with HCl.
 c. Free radical halogenation of 2,5-dimethylhexane with Cl₂
15. Which of the compounds below are isomers:

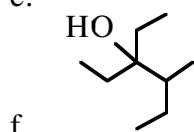
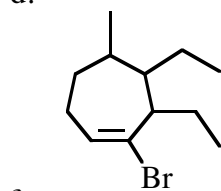
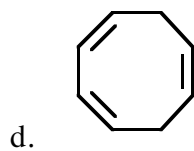
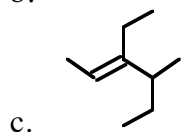
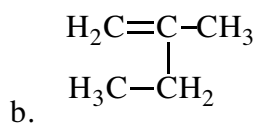
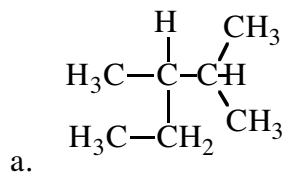


- a. I and II b. II and III
 c. III and IV d. IV and I

16. The alkylation of aromatic compounds is done using an alkyl halide and AlCl₃. Depending on what is already on the ring, you may obtain one of several different products. The following reaction shows the three possible products one could obtain when nitro benzene is reacted with chloroethane. Circle the most likely product(s). (3 pts)



17. Name or draw the following compounds. Lewis or wire frame structures are acceptable as are systematic or common names for whole compounds or substituents. (2 pts each):



g. 2,3-pentanediol

h. 4-(1-methylpropyl)-2,5-heptadiene

i. 4-methylcyclohexene