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Organic chemistry nomenclature test pdf

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Exercise 3-1 Draw structural formulas corresponding to the following names: a. 2,7,8-trimethyldecane b. 2,3,4-trimethyl-4-propylheptane c. 5-(1,1-dimethylpropyl)nonane d. 4-(chloromethyl)-5-(1-nitroethyl)decane Exercise 3-2 Give the IUPAC name for each of the following structures: a. $\backslash\text{ce}\{(\text{CH}_3)_2\text{CHCH}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)_2\}$ b. $\backslash\text{ce}\{\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_2\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3\}$ c. $\backslash\text{ce}\{\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_2\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)_2\}$ d. $\backslash\text{ce}\{\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2\}$ Exercise 3-3 The following are improper IUPAC names. Determine what is incorrect or ambiguous about the name and give the correct name. a. 2-methyl-3-propylpentane b. 3-methyl-3-chloropentane c. 2,3,3,7,7-pentamethyloctane d. 3-(1,1-dimethylethyl)pentane Exercise 3-4 Write structural formulas for each of the following: a. (2,2-dimethylpropyl)cyclopentane b. 1,2,3-tri(chloromethyl)cyclopropane c. 1,4-dicyclohexylcyclooctane d. 1-(1-methylcyclopropyl)-1,2,2,3,3-pentamethylcyclopropane Exercise 3-5 Give the IUPAC name for each of the following: a. b. c. d. Exercise 3-6 Write structural formulas corresponding to the following IUPAC names: a. 1,3,6-trimethylcyclohexene b. 1,2,3,3-tetrachlorocyclopropane c. 2,5-dimethyl-1,5-hexadiene d. 3-methylidenecyclohexane Exercise 3-7 Give the IUPAC name for each of the following: a. b. c. d. Exercise 3-8 Draw structures for the following compounds: a. 1,3-hexadien-5-yne b. 1-cyclodecen-4-yne c. 5-ethynyl-1,3,6-heptatriene d. 3-methylidenecyclooctyne Exercise 3-9 There are nine heptane isomers of formula $\backslash\text{ce}\{\text{C}_7\text{H}_{16}\}$. Write structural formulas for each. Name each by the IUPAC system. (In working a problem such as this, proceed systematically by constructing first the heptane, then all the possible hexanes, the pentanes, and so on. Should you inadvertently duplicate a structure, this will become apparent when you name it; duplicate names usually are easier to spot than duplicate structures.) Exercise 3-10 Write structural formulas for the eight position isomers of $\backslash\text{ce}\{\text{C}_5\text{H}_{11}\text{Cl}\}$. Name each as a chloroalkane. Exercise 3-11 Name each of the following hydrocarbons by the IUPAC system: a. b. c. d. e. $\backslash\text{ce}\{(\text{CH}_3\text{CH}_2\text{CH}_2)_4\text{C}\}$ f. Exercise 3-12 Draw the structure of 1,1-dimethyl-3-(1-methylethyl)cyclohexane four times. In the first structure circle all the primary carbons; in the second, circle all the secondary carbons; in the third, circle the tertiary carbons; in the fourth, circle the quaternary carbons. Exercise 3-13 Draw the possible primary alkyl or alkenyl groups of formulas: a. $\backslash\text{ce}\{\text{C}_5\text{H}_{11}\}$ (four) b. $\backslash\text{ce}\{\text{C}_5\text{H}_9\}$ (eight) Exercise 3-14 Write structural formulas for the following substituent groups: a. chloromethyl b. 1-chloroethyl c. 3-methylbutyl d. 1,2-dimethylpropyl e. 1-methyl-2-propenyl f. 2-methyl-1-propenyl g. 1-buten-3-ynyl h. 2-methylcyclohexyl i. 2-cyclohexenyl j. phenylmethyl k. para-nitrophenyl l. 2,4-dichlorophenyl m. propylidene Exercise 3-15 Name the following substituent groups by the IUPAC system and indicate whether they are primary, secondary, tertiary, or aryl groups: a. $\backslash\text{ce}\{\text{BrCH}_2\text{CH}_2\text{CH}_2\}$ b. $\backslash\text{ce}\{(\text{CH}_3\text{CH}_2)_3\text{C}\}$ c. $\backslash\text{ce}\{\text{CH}_3\text{C}\equiv\text{CCH}_2\}$ d. e. f. g. Exercise 3-16 Write structural formulas for each of the following substances: a. 1-octene b. 1,4-hexadiene c. 1,2-dimethylcyclobutane d. 1,2-cyclononadiene e. 3-chloro-3-methyl-1-butyne f. cyclooctyne g. 2-chloro-1,3-butadiene h. 3-methyl-2-hexen-4-yne i. (1,1-dimethylethyl)benzene j. (1-methylpropyl)benzene k. meta-nitrotoluene l. 1-phenyl-1-methylcyclohexane m. phenylmethylcyclohexane Exercise 3-17 Name each of the following substances by the IUPAC system: a. $\backslash\text{ce}\{(\text{CH}_3)_2\text{C}=\text{CHCH}_3\}$ b. $\backslash\text{ce}\{\text{Cl}_2\text{C}=\text{C}(\text{CH}_3)_2\}$ c. $\backslash\text{ce}\{(\text{CH}_3)_2\text{C}=\text{C}=\text{CHBr}\}$ d. e. f. g. h. i. j. Exercise 3-18 Decide whether the following structures are named correctly according to the IUPAC rules. If a name is incorrect or ambiguous, assign the correct name: a. 1-ethyl-2-methylbutane b. $\backslash\text{ce}\{\text{Cl}_2\text{CHCHCl}_2\}$ tetrachloroethane c. 1-methyl-2-cyclohexene d. $\backslash\text{ce}\{\text{CH}_2=\text{CHCH}_2\text{Cl}\}$ 1-chloro-2-propene e. 2-ethynyl-2-butene f. phenylpropane g. dinitrobenzene h. $\backslash\text{ce}\{(\text{CH}_3)_2\text{CHCH}_2\text{CH}_3\}$ isopentane Exercise 3-19 a. The major component in the oil obtained from pressing the rinds of oranges and lemons is a hydrocarbon called limonene. It is obtained in commercial quantities from citrus rind and is sold as a flavoring and perfume agent. Name limonene by the IUPAC system. b. The carbon skeleton of limonene is made up of branched five-carbon repeating segments called isoprene (or isoprenoid) units. Furthermore, limonene has the formula $\backslash\text{ce}\{\text{C}_{10}\text{H}_{16}\}$, which corresponds to two $\backslash\text{ce}\{\text{C}_5\text{H}_8\}$ isoprene molecules linked together. What is the IUPAC name for isoprene? Indicate the isoprene units in the limonene structure by drawing a dotted line through each of the bonds that joins one isoprene unit to the other. c. Like limonene, $\backslash\text{beta}\backslash$ -carotene and vitamin A have carbon skeletons made up of isoprenoid units. These compounds belong to a class of naturally occurring compounds called terpenes. Mark off the isoprenoid units in $\backslash\text{beta}\backslash$ -carotene and vitamin A as you did for limonene. Exercise 3-20 If you have access to the 1967-71 Eighth Collective Subject Index of Chemical Abstracts, locate the page number in the index where each of the compounds shown in Exercise 2-8 occurs and give the name used. Notice that past Chemical Abstracts indexes do not use completely systematic nomenclature, especially for compounds with only a few carbons, but these indexes will be made completely systematic in the future. John D. Robert and Marjorie C. Caserio (1977) Basic Principles of Organic Chemistry, second edition. W. A. Benjamin, Inc. , Menlo Park, CA. ISBN 0-8053-8329-8. This content is copyrighted under the following conditions, "You are granted permission for individual, educational, research and non-commercial reproduction, distribution, display and performance of this work in any format." Select one of the options below to try a quiz of this level. Upon selecting an option, the corresponding categories to the different levels will be identified. Please note these categories can be modified in the section "Create your own quiz". Create your own quiz Available questions/ Start Quiz Nomenclature of Organic Compounds Learning Outcomes On completing these problems you should be able to: • Draw the structures of moderately complex organic molecules from the IUPAC name. • Demonstrate an understanding of the principles of organic nomenclature. Because the number of known organic structures runs to many millions, and the number of possible structures is infinite, a sophisticated nomenclature system that is capable of naming structures unambiguously is needed. The most widely used system of nomenclature is that formulated by the International Union for Pure and Applied Chemistry, usually called the IUPAC system. Although software is increasingly used both to assign names to structures and to derive structures from names, it is still important that chemists be able to understand IUPAC names. On this page you can learn about the nomenclature of organic compounds by drawing structures corresponding to IUPAC names. Set your own goals to suit your learning needs, but one measure of completing the section would be to achieve a score (below right, in green) of at least 40 points from 50 for five "Difficult" problems from the "All functional groups" category. Note that 3 points are deducted for each incorrect answer, and your score will be reset to zero if you reload the page. How To Use This Page: First, choose the family of compounds you want to work on, choose an "Easy", "Medium" or "Difficult" problem. Next, choose the "mode". In the default "Problem" mode, you can test yourself by drawing the structure of the molecule directly into the molecular editor window, some feedback will be provided, and your score will be updated. In "Guided" mode, you will be guided through the process of drawing the structure in a stepwise manner, and detailed feedback will be provided at each stage. This mode is designed to help you learn the basics of organic nomenclature and the score is not recorded. Finally, click the "Get Problem" button, and the problem will appear to the left of the molecule drawing window, together with instructions on how to proceed. Feedback on your answer will be provided below the molecular editor window. If the structure is not correct, study the feedback and consult the relevant Help pages if you wish, then modify the structure and and click on the "Check Structure" button again. When you draw the correct structure, you will have an option to transfer it to the 3D molecular viewer "JSmol" (Help) and manipulate it. You must complete each problem before you can choose another one. Review your progress regularly and move on to problems of a different level of difficulty, or relating to different functional groups, as appropriate. ChemInteractive is still in the development and testing phase.This page is fully functional, but very few problems of some types are available. More problems, and some improvements in features are now being added, but the page can be used as is. If you have any comments or suggestions, please leave them here.

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