

CHAPTER 23 STUDY GUIDE FOR CONTENT MASTERY

Substituted Hydrocarbons and Their Reactions

Section 23.1 Functional Groups

In your textbook, read about functional groups.

Circle the letter of the choice that best completes the statement or answers the question.

- In hydrocarbons, carbon atoms are generally linked to
 - other carbon atoms only.
 - hydrogen atoms only.
 - both carbon and hydrogen atoms.
 - atoms of any element.
- Which of the following is an element commonly found in organic compounds?
 - nitrogen
 - argon
 - cesium
 - calcium
- Atoms or groups of atoms, other than hydrogen and carbon, that occur in organic molecules and react in a certain way are called
 - functional groups.
 - polymers.
 - radicals.
 - monomers.
- Which of the following is NOT a functional group?
 - a double bond
 - a triple bond
 - an alkane chain
 - a chlorine atom

In your textbook, read about organic compounds containing halogens.

Use each of the terms below just once to complete the passage.

alkyl halide	aryl halide	benzene	chiral	halocarbon	optical isomer
--------------	-------------	---------	--------	------------	----------------

Any organic compound containing a fluorine, chlorine, bromine, or iodine substituent is called a(n) (5) halocarbon. Such a compound in which the substituent replaces a

hydrogen in a hydrocarbon containing only single bonds is called a(n)

(6) alkyl halide. If the substituent replaces a hydrogen bonded to an aromatic compound such as (7) benzene, the resulting compound is called a(n)

(8) aryl halide. If an organic compound contains four different groups attached to the same carbon atom, the compound is referred to as a(n) (9) optical isomer. In that case, the carbon atom is called a(n) (10) chiral carbon.

CHAPTER 23 STUDY GUIDE FOR CONTENT MASTERY

Section 23.2 Alcohols, Amines, and Ethers

In your textbook, read about the structure and properties of alcohols.

Circle the letter of the choice that best completes the statement or answers the question.

- An alcohol is an organic compound in which a hydrogen atom of a hydrocarbon has been replaced by
 - a hydroxyl group.
 - an oxygen atom.
 - an NH_2 group.
 - a COOH group.
- Which of the following suffixes is used in naming alcohols?
 - al
 - ol
 - yl
 - ene
- The alcohol produced commercially in largest quantity is
 - methanol.
 - isopropyl.
 - ether.
 - ethanol.
- Alcohol molecules are generally
 - nonpolar.
 - ionic.
 - very slightly polar.
 - moderately polar.
- The alcohol produced by yeasts is
 - methanol.
 - ethanol.
 - isopropanol.
 - cyclohexanol.
- The simplest alcohol is
 - methanol.
 - ethanol.
 - isopropanol.
 - butanol.
- A poisonous alcohol used as a solvent for certain plastics and in the manufacture of insecticides is
 - butanol.
 - ethanol.
 - cyclohexanol.
 - isopropanol.
- Which of the following describes the solubility of ethanol in water?
 - completely insoluble
 - slightly soluble
 - immiscible
 - completely miscible
- What intermolecular attraction gives alcohols many of their physical properties?
 - London forces
 - hydrogen bonds
 - ionic forces
 - dipole-dipole forces
- Denatured alcohol is
 - a mixture of two alcohols.
 - ethanol to which noxious solvents have been added.
 - ethanol that has been distilled.
 - ethanol diluted with water.
- How is ethanol generally removed from a water solution?
 - filtration
 - distillation
 - adsorption
 - precipitation
- The position of the functional group in an alcohol is indicated in its name by a
 - letter at the end.
 - number and dash at the end.
 - letter at the beginning.
 - number and dash at the beginning.

Section 23.2 continued

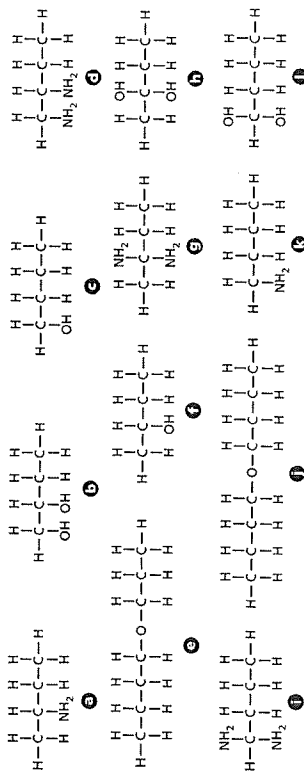
In your textbook, read about the structure and properties of ethers and amines.

For each statement below, write *true* or *false*.

- true** 13. An ether contains an oxygen atom bonded to two carbon atoms.
true 14. Ethers generally have much lower boiling points than alcohols of the same size.
false 15. Ethers generally are more soluble in water than are alcohols.
false 16. Ether molecules form hydrogen bonds with each other.
true 17. Amines contain nitrogen bonded to carbon.
true 18. More than one amino group can be present in an amine molecule.
false 19. Amines are typically acids.
false 20. Volatile amines tend to have pleasant odors.

In your textbook, read about naming alcohols, amines, and ethers.

Match each of the lettered structures (a-l) to the following names.



- c** 21. 1-butanol
f 22. 2-butanol
l 23. 1,1-butanediol
h 24. 2,2-butanediol
b 25. 1,2-butanediol
j 26. butyl ether
e 27. butylpropyl ether
k 28. 1-butyamine
a 29. 2-butyamine
i 30. 1,1-butyldiamine
g 31. 2,2-butyldiamine
d 32. 1,2-butyldiamine

Section 23.3 Carbonyl Compounds

In your textbook, read about aldehydes and ketones.

Circle the letter of the choice that best completes the statement or answers the question.

- In a carbonyl group, an oxygen atom is
 - single-bonded to a carbon atom.
 - double-bonded to a carbon atom.
 - bonded to a hydrogen atom.
 - bonded to a carbon atom and another oxygen atom.
- Which of the following makes a compound a ketone?
 - a carbonyl group at the end
 - a carbonyl group between carbon atoms
 - a carbonyl group at the end
 - a carbonyl group between carbon atoms
- The formal names of aldehydes end with the suffix
 - one.
 - al.
 - oic.
 - ene.
- Which of the following correctly expresses the order of solubility, from greatest to least, of aldehydes, alcohols, and alkanes?
 - aldehydes, then alkanes, then alcohols
 - aldehydes, then alcohols, then alkanes
 - alcohols, then aldehydes, then alkanes
 - alcohols, then alkanes, then aldehydes
- Which of the following is true of ketones in comparison to aldehydes?
 - Neither is polar, and they are equally reactive.
 - Ketones are polar, but aldehydes are not, and ketones are less reactive.
 - Both are polar, and ketones are more reactive.
 - Both are polar, and ketones are less reactive.

In your textbook, read about carboxylic acids, esters, and amides.

Use each of the terms below just once to complete the passage.

amide	carboxyl	carboxylic acids	ester	-oic	proteins
-------	----------	------------------	-------	------	----------

The COOH group is called a(n) **(6)** carboxyl. That group is found in the organic compounds called **(7)** carboxylic acids. The formal name of such compounds is formed by adding the suffix **(8)** -oic to the corresponding alkane, followed by the word *acid*. A(n) **(9)** ester is a compound in which the acidic hydrogen of an organic acid is replaced by a carbon atom or hydrocarbon chain. A(n) **(10)** amide is a compound in which the -OH group of an organic acid is replaced by a nitrogen atom bonded to other atoms. The functional group of such compounds is found in **(11)** proteins.