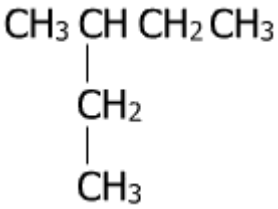
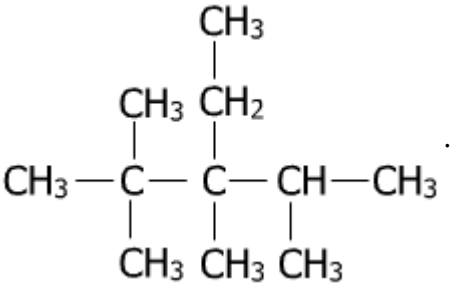
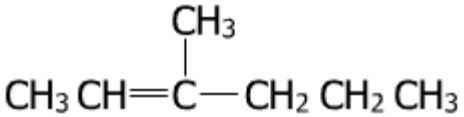
Chem.G11-Q3W6-Organic chemistry-Qs. Bank

True/False
Indicate whether the statement is true or false.

____ 1. The IUPAC name of  is 2-ethyl butane.

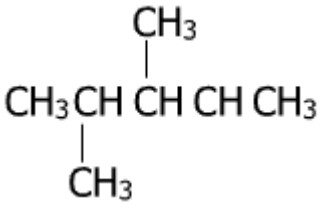
____ 2. The structure of 3-ethyl-2,2,3,4-tetramethylpentane is  .

____ 3. The IUPAC name of  is 3-methyl-3-hexene.

____ 4. Aldehydes cannot form hydrogen bonds.

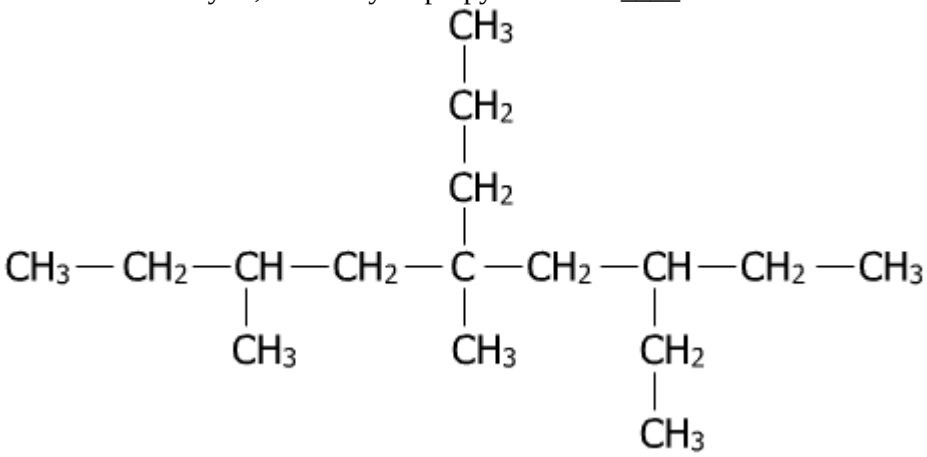
____ 5. Cyclohexane is a cyclic hydrocarbon having six carbon atoms in a straight chain.

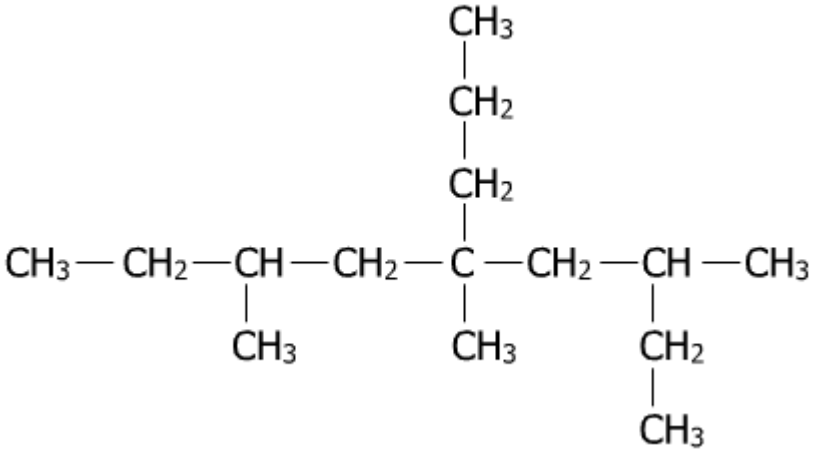
Multiple Choice
Identify the choice that best completes the statement or answers the question.

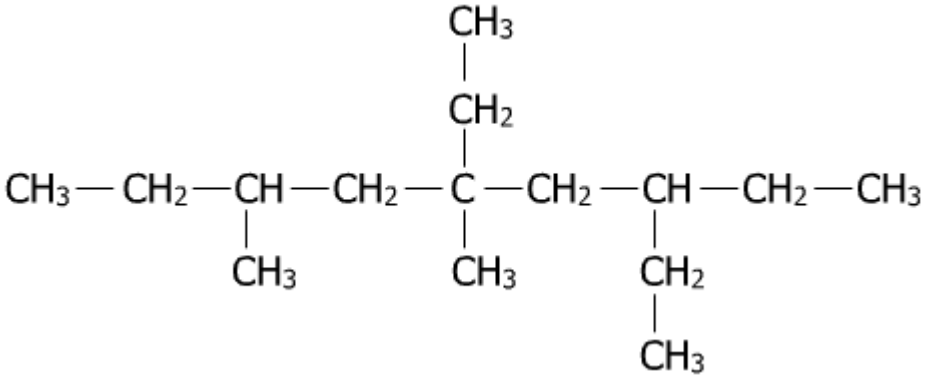
____ 6. The correct IUPAC name of the compound  is ____.

a. 3,4-dimethylpentane
b. 2,3-dimethylbutane
c. 2,3-dimethylpentane
d. 2,2,3-dimethylbutane

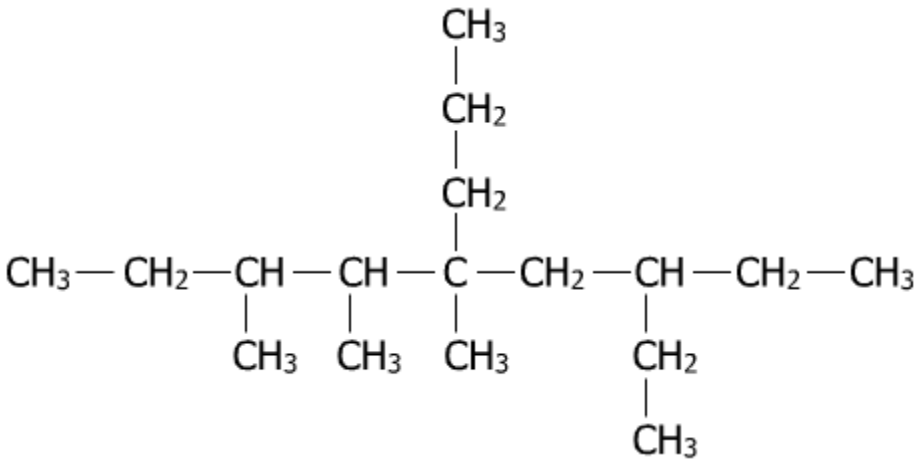
____ 7. The structure of 3-ethyl-5,7-dimethyl-5-propylnonane is ____.

a. 

b. 

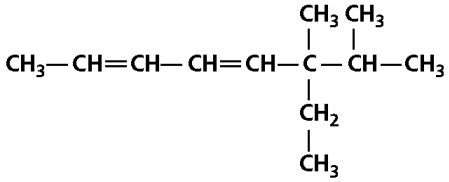
c. 

d.

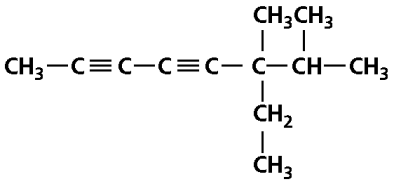


____ 8. The correct condensed structure of a compound having the IUPAC name 6-ethyl-6,7-dimethyl-2,4-dioctyne is ____.

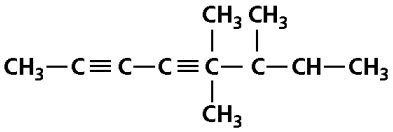
a.



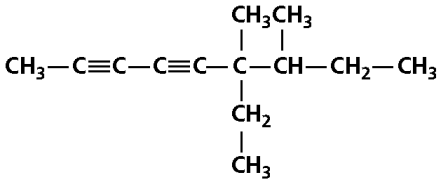
b.



c.



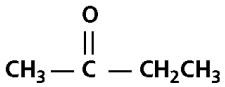
d.



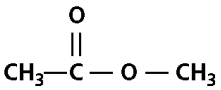
____ 9. Which compound has a hydroxyl group?

a. CH_3-OH

b.



c.



d. $CH_3-O-CH_2CH_3$

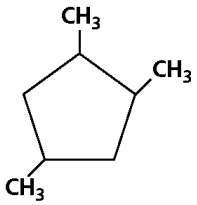
____ 10. Which polymer is a condensation polymer?

a. Orlon
b. Teflon
c. PET
d. Nylon-6,6

____ 11. Which of the following substances can be remolded without changing the chemical composition?

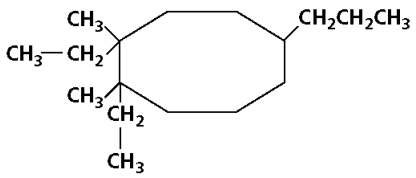
a. Polyethylene
b. Glycine
c. Bakelite
d. Propanoic acid

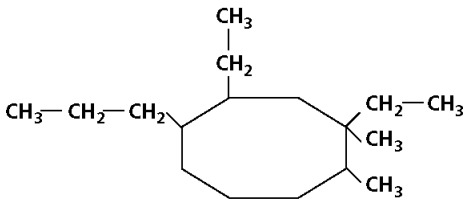
____ 12. Name the cycloalkane given below.

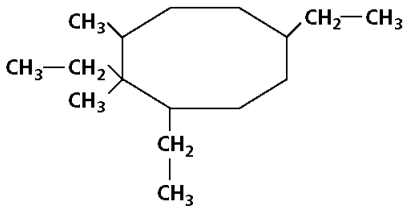


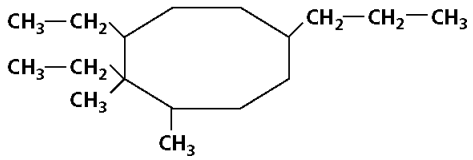
a. 1,2,4-trimethylcyclohexane
b. 1,2,4-dimethylcyclopentane
c. 1,2,4-trimethylcyclopentane
d. 1,3,5-trimethylcyclopentane

____ 13. The correct structural formula of 1,2-diethyl-2,3-dimethyl-6-propylcyclooctane is ____.

a.


b.


c.


d.


____ 14. Isomers have _____.
a. the same chemical and physical properties
b. the same chemical properties, but different physical properties
c. different chemical properties, but the same physical properties
d. different chemical and physical properties

____ 15. The term *cis* or *trans* in the name of a compound shows that the compound is a(n) _____.
a. alkane
b. alkyne
c. polymer
d. geometric isomer

____ 16. The six extra electrons in a benzene molecule are _____.
a. arranged in double bonds
b. arranged in alternate single and double bonds
c. shared equally by all six carbon atoms
d. shared equally by all six hydrogen atoms

____ 17. An organic compound that contains a carbon atom bonded to a hydrogen atom and double-bonded to an oxygen atom is an _____.

a. alkene
b. alcohol
c. aldehyde
d. ether

____ 18. A process that typically yields alcohols is _____.

a. distillation
b. fermentation
c. polymerization
d. cracking

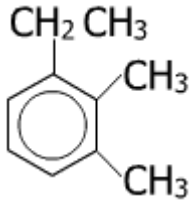
____ 19. A monomer can take part in an addition reaction if it contains _____.

a. glucose
b. two functional groups
c. a double or triple bond
d. a pair of single bonds

____ 20. Which pair of reactants listed below could take part in a condensation reaction?

a. methane and an alcohol
b. water and an alcohol
c. an alkane and an alcohol
d. an amine and a carboxylic acid

Completion
Complete each statement.

21. The structure of 3-ethyl-4-methylhexane is _____.
22. The IUPAC name of  is _____.
23. When small amounts of noxious material is added to ethanol, it becomes unfit for drinking and is known as _____.
24. The IUPAC name of  is _____.
25. The IUPAC name of a compound represented by the line structure  is _____.

Matching

Match each item with the correct statement below.

a. addition reaction
b. aromatic hydrocarbons
c. cross-linking
d. fractional distillation
e. functional group
f. isomers
g. polymer
h. reforming
i. saturated hydrocarbon
j. substituted hydrocarbon
k. thermosetting

____ 26. A(n) _____ plastic is one that remains hard and rigid once it has been formed.
____ 27. _____ are compounds that have the same molecular formula, but different structural formulas.
____ 28. A(n) _____ is a large molecule that is made up of many smaller repeating units.
____ 29. A(n) _____ is a compound that contains only carbon and hydrogen atoms joined to each other by single bonds.
____ 30. In the process known as _____, large hydrocarbons can be converted to other compounds, such as aromatic hydrocarbons.
____ 31. _____ is a process by which adjacent chains in a polymer join together and strengthen the polymer.
____ 32. The portion of an organic molecule that is responsible for the properties of that molecule is known as a(n) _____.
____ 33. Hydrocarbons that contain a benzene-like structure are classified as _____.
____ 34. Polymers are made when monomers containing double bonds combine with each other in a reaction known as a(n) _____.
____ 35. _____ is the process by which complex organic mixtures can be separated into their constituents.

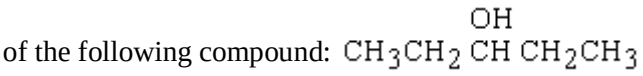
Short Answer

36. Use line structures to draw the condensed structural formulas for:
    a. 1-ethyl-2,3-dimethylcyclopropane
    b. 1,2-diethyl-1-methylcyclobutane
    c. 3,5-diethyl-2,2-dimethyl-1-propylcyclohexane

37. Give the correct name for the following compound: $CH_3CH_2CH_2CH_2CH_2CH_3$

38. Give the correct name for the following compound: $CH_3CH{=}CHCH_2CH_3$

39. Give the correct name for the following compound: $CH_3CHFCH_2CH_3$

40. Name the family of the following compound: 

41. Why are there so many more organic compounds than inorganic compounds?

42. As the number of carbon atoms in an alkane increases, what happens to the number of isomers the alkane can form?

43. Suppose that a particular alkane exists in liquid form and has five isomers. How could you separate the isomers?

44. Do all alkenes have geometric isomers? Explain.

Explain what makes each of the names listed below incorrect.

45. methene

46. 1-methylpropane

47. 4-pentene

48. 4-propyne

49. For the following pair of compounds, tell whether a polymerization reaction can or cannot take place and, if it can, what type of polymerization reaction it is. $HOCH_2CH_2CH_2CH_2CH_2OH$ and $CH_2ClCH_2CH_2CH_2Cl$

50. For the following pair of compounds, tell whether a polymerization reaction can or cannot take place and, if it can, what type of polymerization reaction it is. $CH_3CH{=}CH_3$ and $CH_2OHCH_2CH_2CH_2OH$

51. Identify the following hydrocarbon as alkane, alkene, or alkyne:
    cis-2-pentene

52. Name the following hydrocarbon, and identify as an alkane, alkene, or alkyne: $CH_3CH_2C{\equiv}CCH_2CH_3$

53. Classify the molecule shown in Figure 18-2 as alcohol, ester, ketone, or amide.

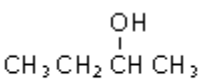


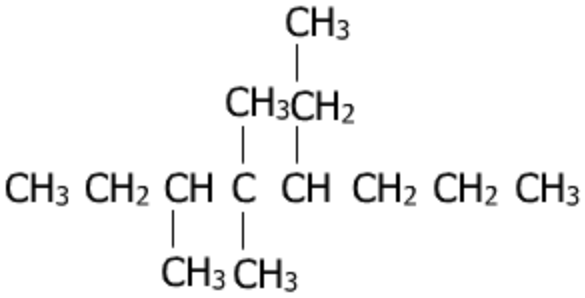
Figure 18-2

54. The molecular formulas of the noncyclic alkanes follow the pattern C_nH_{2n+2}, where *n* is the number of carbon atoms. What pattern is followed by the noncyclic alkenes with two double bonds?

55. Describe the structural characteristics of a monomer molecule that reacts by a condensation reaction to form a polymer.

Problems

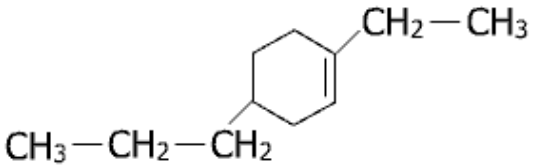
56. Write the IUPAC name of the following structure:



57. a. Find the molecular formula of alkenes having five and eight carbon atoms.
    b. Write the condensed structural formulas for these alkenes by putting a double bond between the first and second carbon atom of the longest carbon atom chain.

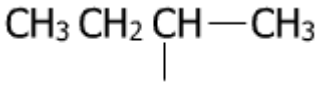
58. A hydrocarbon has a formula C_5H_8. Identify the class of hydrocarbons to which it belongs. Also draw its condensed structural formula. If it is an alkene or an alkyne, use the double or triple bond at the first carbon of the longest chain.

59. Determine the IUPAC name of the following structure:



60. Draw the structure of the compounds:
    a. 3,4-dimethyl-1-cyclobutene
    b. 3-ethyl-2,4,6,8-tetramethyl-5-propyl-2,4,6-trinonene

61. Name the functional group present in the following compound.



COR

A chemist is studying several unknown compounds. For each one, she has narrowed down the final identification to one of the two choices shown. Use the additional data shown in parentheses to make the correct choice for each.

62. methane or octane (Has structural isomers.)

63. butane or 1-butene (Reacts readily with chlorine gas.)

64. benzene or benzoyl alcohol (Forms a polymer.)

65. 2-pentene or pentyl alcohol (Forms geometric isomers.)

66. natural rubber or vulcanized rubber (Melts when heated.)
67. cellulose or nylon (Product breaks down to give only glucose.)
68. Write the structural formula for the branched alkane 3-ethylheptane.
69. Draw the structure of the unsaturated hydrocarbon 3-heptene.
70. Show the structure of the product of the following reaction: $CH_2=CHCH_2CH_2CH_3 + H_2 \rightarrow ?$
71. Distinguish between a carboxylic acid and an ester.
72. Give two properties and two uses of ethers. Draw the structures of diethyl ether.
73. Halogen molecules such as Br_2 can be added to double or triple bonds in a reaction similar to hydrogenation. Draw the structure of the product that forms when two molecules of Br_2 are added to 2-pentyne.
74. Draw a halogenated compound, where *R* is $CH_2=CHCH_2^-$ and *X* is Cl.
75. Draw the structure of the polymer that will be formed from each of the monomer $CH_2=CCl_2$.

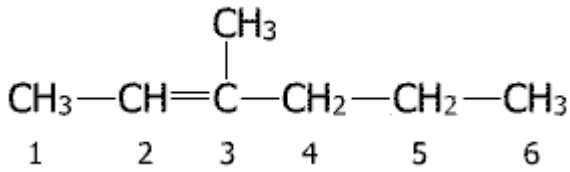
Chem.G11-Q3W6-Organic chemistry-Qs. Bank
Answer Section

TRUE/FALSE

1. ANS: F
   The ethyl (C_2H_5) group at the second position forms part of the parent chain and not a substituent alkyl group.

   PTS: 1 DIF: 2 REF: Page 625 | Page 626
   OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   KEY: Nomenclature | Hydrocarbons MSC: 2
   NOT: /T/ The methyl group is not a part of the longest chain. /F/ Correct!
2. ANS: T
   The carbon atoms of the parent chain are numbered such that the alkyl groups are given the lowest number.

   PTS: 1 DIF: 3 REF: Page 623
   OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   KEY: Structure of branched hydrocarbon MSC: 2
   NOT: /T/ Correct! /F/ The structure of compounds is drawn by placing the alkyl groups at specific places on the longest carbon chain.
3. ANS: F
   The correct IUPAC name of the given compound is 3-methyl-2-hexene.



   PTS: 1 DIF: 1 REF: Page 625 | Page 626
   OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
   KEY: Nomenclature of alkenes MSC: 2
   NOT: /T/ The IUPAC name depends on the position of the double bond in a compound. Bonds are numbered in a way that gives the lowest set of numbers. /F/ Correct!
4. ANS: T
   Aldehydes do not have hydrogen atoms bonded to an oxygen atom.

   PTS: 1 DIF: 1 REF: Page 644
   OBJ: 18.2.2 Summarize properties and uses of each class of substituted hydrocarbon.
   TOP: Summarize properties and uses of each class of substituted hydrocarbon.

KEY: Aldehydes MSC: 2
NOT: /T/ Correct! /F/ The compound must have hydrogen bonded to an oxygen atom to be able to form a hydrogen bond.

5. ANS: F
The prefix cyclo indicates the presence of a ring in the structure of a hydrocarbon.

PTS: 1 DIF: 1 REF: Page 623 | Page 624
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Cycloalkanes MSC: 1
NOT: /T/ Straight-chain hydrocarbons do not have a prefix, cyclo, since all the carbon atoms are present in the form of a straight chain. /F/ Correct!

MULTIPLE CHOICE

6. ANS: C
The longest chain has five carbon atoms. The numbering of the chain is done such that all the alkyl groups get the lowest possible position number. The names selected for the alkyl groups and the parent chain are according to the IUPAC rules.

	Feedback
A	The numbering of the chain is incorrect.
B	The carbon atoms in the longest chain are not counted correctly.
C	Correct!
D	The selection of the longest chain is incorrect.

PTS: 1 DIF: 2 REF: Page 625 | Page 626
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Naming | Branched-chain hydrocarbon MSC: 2

7. ANS: A
The longest chain is drawn correctly and the alkyl groups are put at the right places.

	Feedback
A	Correct!
B	The longest chain has eight carbon atoms.
C	The ethyl group is drawn instead of the propyl group.
D	There is one extra methyl group at the sixth carbon atom of the longest carbon chain.

PTS: 1 DIF: 3 REF: Page 623
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Structure | Branched alkane MSC: 2

8. ANS: B

The compound is an alkyne because there are two triple bonds between the carbon atoms in the chain. The longest chain has eight carbon atoms. The ethyl group is attached to carbon atom number 6 and the methyl groups are attached to carbon atom numbers 6 and 7.

	Feedback
A	Double bonds are drawn in place of triple bond.
B	Correct!
C	The methyl group is drawn in place of the ethyl group.
D	The longest chain has nine carbon atoms.

PTS: 1 DIF: 3 REF: Page 633
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature of alkynes MSC: 2

9. ANS: A
Alcohols have a hydroxyl (OH) functional group.

	Feedback
A	Correct!
B	The compound has a ketone group as the functional group.
C	The compound has an ester group as the functional group.
D	The compound has an ether group as the functional group.

PTS: 1 DIF: 2 REF: Page 642
OBJ: 18.2.1 Compare and contrast the structures of the major classes of substituted hydrocarbons.
TOP: Compare and contrast the structures of the major classes of substituted hydrocarbons.
KEY: Functional groups MSC: 2

10. ANS: D
Nylon-6,6 is a condensation polymer of two monomers—adipic acid and 1,6-diamino hexane.

	Feedback
A	Orlon is an addition polymer of acrylonitrile.
B	Teflon is addition polymer of tetrafluoro-ethylene.
C	PET is an addition polymer of ethylene terephthalate.
D	Correct!

PTS: 1 DIF: 2 REF: Page 658
OBJ: 18.3.2 Differentiate between condensation and addition polymerization reactions.
TOP: Differentiate between condensation and addition polymerization reactions.
KEY: Addition polymer | Condensation polymer MSC: 2

11. ANS: A
Polyethylene is a thermoplastic polymer, hence it can be melted and molded without changing its chemical composition.

	Feedback
A	Correct!
B	Glycine is an amino acid and not a polymer.
C	Bakelite is a thermosetting polymer.

D	Propanoic acid is not a polymer.

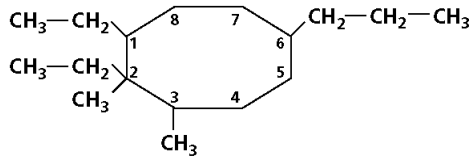
PTS: 1 DIF: 1 REF: Page 660
OBJ: 18.3.3 Summarize the relationship between structure and properties of polymers.
TOP: Summarize the relationship between structure and properties of polymers.
KEY: Thermoplastic polymer MSC: 2

12. ANS: C
The compound is a cyclic hydrocarbon having a five-member carbon ring and a methyl group as a substituent at 1, 2, and 4 positions. The numbering of the cyclic ring is chosen such that the lowest possible numbers are given to the methyl groups.

	Feedback
A	The use of the word cyclohexane is wrong as it indicates the presence of six carbon atoms in the ring.
B	The use of the word di is wrong as it indicates the presence of two substituents (methyl group) of the same type.
C	Correct!
D	The order of numbering a cyclic ring is incorrect.

PTS: 1 DIF: 1 REF: Page 623 | Page 624
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature | Cycloalkanes MSC: 2

13. ANS: D



The numbering of the carbon ring is chosen such that the lowest position numbers are given to the alkyl groups.

	Feedback
A	There is only one ethyl group at the first carbon atom.
B	There is only one ethyl group at the first carbon atom.
C	There is an ethyl group at the sixth carbon atom.
D	Correct!

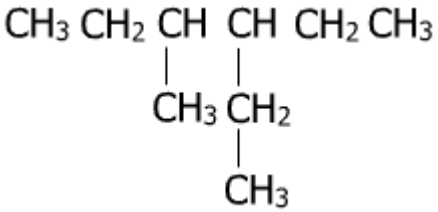
PTS: 1 DIF: 3 REF: Page 623 | Page 624
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Cyclic alkane MSC: 2

14. ANS: D PTS: 1 DIF: B OBJ: 18-2
15. ANS: D PTS: 1 DIF: B OBJ: 18-2
16. ANS: C PTS: 1 DIF: B OBJ: 18-4
17. ANS: C PTS: 1 DIF: B OBJ: 18-4

18. ANS: B PTS: 1 DIF: B OBJ: 18-5
19. ANS: C PTS: 1 DIF: B OBJ: 18-7
20. ANS: D PTS: 1 DIF: B OBJ: 18-7

COMPLETION

21. ANS:



PTS: 1 DIF: 3 REF: Page 623
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Structure | Branched hydrocarbon MSC: 2

22. ANS: 2-hexyne

PTS: 1 DIF: 1 REF: Page 625 | Page 626
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature of alkynes MSC: 2

23. ANS: denatured alcohol

PTS: 1 DIF: 1 REF: Page 642
OBJ: 18.2.2 Summarize properties and uses of each class of substituted hydrocarbon.
TOP: Summarize properties and uses of each class of substituted hydrocarbon.
KEY: Alcohols MSC: 1

24. ANS: 1-ethyl-2,3-dimethylbenzene

PTS: 1 DIF: 1 REF: Page 636
OBJ: 18.1.2 Distinguish among isomers of a given hydrocarbon.
TOP: Distinguish among isomers of a given hydrocarbon.
KEY: Nomenclature of aromatic compound MSC: 2

25. ANS: cyclopropane

PTS: 1 DIF: 1 REF: Page 623 | Page 624
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Cycloalkanes MSC: 1

MATCHING

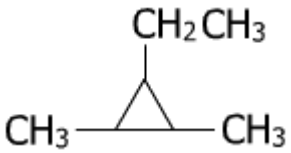
26. ANS: K PTS: 1 DIF: B OBJ: 18-8

27. ANS: F PTS: 1 DIF: B OBJ: 18-2
28. ANS: G PTS: 1 DIF: B OBJ: 18-6
29. ANS: I PTS: 1 DIF: B OBJ: 18-5
30. ANS: H PTS: 1 DIF: B OBJ: 18-3
31. ANS: C PTS: 1 DIF: B OBJ: 18-8
32. ANS: E PTS: 1 DIF: B OBJ: 18-5
33. ANS: B PTS: 1 DIF: B OBJ: 18-5
34. ANS: A PTS: 1 DIF: B OBJ: 18-7
35. ANS: D PTS: 1 DIF: B OBJ: 18-3

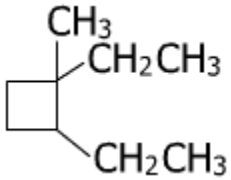
SHORT ANSWER

36. ANS:

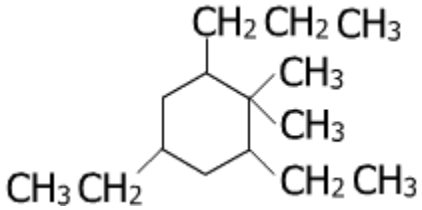
a.



b.



c.



PTS: 1 DIF: 3 REF: Page 623 | Page 624
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature | Cycloalkanes MSC: 2

37. ANS:
hexane

PTS: 1 DIF: B OBJ: 18-1

38. ANS:
2-pentene

PTS: 1 DIF: B OBJ: 18-1

39. ANS:
2-fluorobutane

PTS: 1 DIF: B OBJ: 18-1

40. ANS:
alcohol

PTS: 1 DIF: B OBJ: 18-4

41. ANS:
Carbon is the only element that can bond to itself in very long chains.

PTS: 1 DIF: B OBJ: 18-5

42. ANS:
The number of isomers increases.

PTS: 1 DIF: B OBJ: 18-2

43. ANS:
They could be separated by fractional distillation if they all have different boiling points, for example. Any method that exploits differences in their physical and/or chemical properties could separate the isomers.

PTS: 1 DIF: B OBJ: 18-2

44. ANS:
No; two different groups must be attached to the carbons on the double bond.

PTS: 1 DIF: B OBJ: 18-2

45. ANS:
A double bond with only one carbon atom is not possible.

PTS: 1 DIF: B OBJ: 18-1

46. ANS:
A methyl group on the end of a chain simply extends the chain. This compound is properly named butane.

PTS: 1 DIF: B OBJ: 18-1

47. ANS:
The count has been taken from the wrong end; the name should be 1-pentene.

PTS: 1 DIF: B OBJ: 18-1

48. ANS:
The propyl chain contains only three carbon atoms.

PTS: 1 DIF: B OBJ: 18-1

49. ANS:
yes, a condensation reaction

PTS: 1 DIF: A OBJ: 18-7

50. ANS:
No polymerization can occur.

PTS: 1 DIF: A OBJ: 18-7

51. ANS:
alkene

PTS: 1 DIF: B OBJ: 18-1

52. ANS:

3-hexyne, alkyne

PTS: 1 DIF: B OBJ: 18-1

53. ANS:
alcohol

PTS: 1 DIF: B OBJ: 18-4

54. ANS:
The molecular formulas of the noncyclic alkenes with two double bonds follow the pattern C_nH_{2n-2}. Each noncyclic alkene with two double bonds has four less hydrogen atoms than the corresponding alkane.

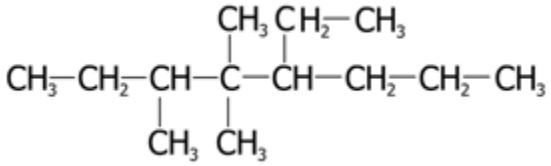
PTS: 1 DIF: B OBJ: 18-1

55. ANS:
The monomer molecule must have two functional groups so that it can add on at each end to another unit of the polymer chain.

PTS: 1 DIF: B OBJ: 18-7

PROBLEM

56. ANS:



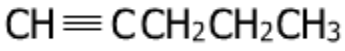
5-ethyl-3,4,4-trimethyloctane

PTS: 1 DIF: 2 REF: Page 625 | Page 626
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature MSC: 2
NOT: Select the longest chain and number it such that the lowest possible number positions are given to alkyl groups.

57. ANS:
The general formula for alkenes is C_nH_{2n}.
a. C_5H_{10} and C_8H_{16}
b. $CH_2=CHCH_2CH_2CH_3$ and $CH_2=CHCH_2CH_2CH_2CH_2CH_2CH_3$

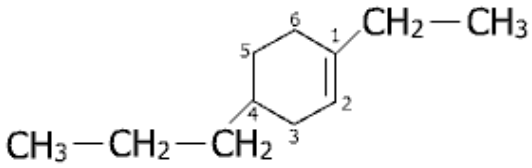
PTS: 1 DIF: 3 REF: Page 630 | Page 631
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Formula of alkenes MSC: 2
NOT: The molecular formula of alkenes is calculated by substituting the value of n as given in the general formula.

58. ANS:
Alkyne



PTS: 1 DIF: 3 REF: Page 633
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Structure of alkynes MSC: 2
NOT: Alkane, alkene, and alkyne all have different general formulas. To find if the given compound is an alkane, alkene, or alkyne, place the value of n in the proper formula and then determine the class of hydrocarbons.

59. ANS:

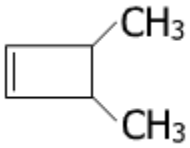


1-ethyl-4-propyl-1-cyclohexene

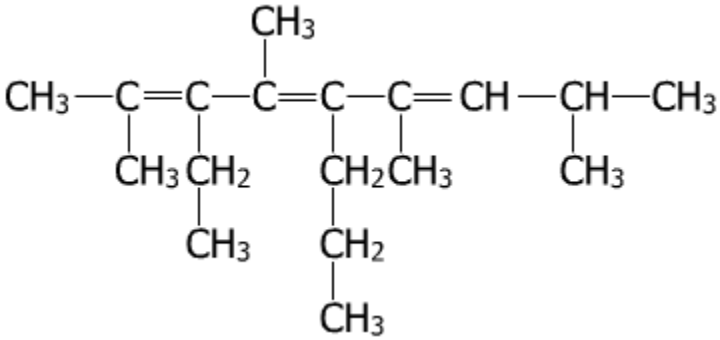
PTS: 1 DIF: 3 REF: Page 631
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature MSC: 2
NOT: The lowest possible numbers are given to substituents on the cyclic ring.

60. ANS:

a.



b.



PTS: 1 DIF: 3 REF: Page 631
OBJ: 18.1.1 Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
TOP: Write and interpret structural formulas of linear, branched, and cyclic alkanes, alkenes, and alkynes.
KEY: Nomenclature of alkenes MSC: 2
NOT: a) While numbering the cyclic compound, one of the carbon atoms connected by a double bond is numbered as one. b) The longest carbon chain is numbered in a way that gives the lowest set of numbers to

double bonds.

61. ANS:
Ketone

PTS: 1 DIF: 3 REF: Page 642 | Page 643 | Page 644
OBJ: 18.2.1 Compare and contrast the structures of the major classes of substituted hydrocarbons.
TOP: Compare and contrast the structures of the major classes of substituted hydrocarbons.
KEY: Functional groups MSC: 2
NOT: A functional group in an organic molecule is an atom or group of atoms that always reacts in a certain way. The addition of a functional group to a hydrocarbon structure always produces a substance with physical and chemical properties that differ from those of the parent hydrocarbon.

62. ANS:
octane

PTS: 1 DIF: B OBJ: 18-2

63. ANS:
1-butene

PTS: 1 DIF: B OBJ: 18-5

64. ANS:
benzoyl alcohol

PTS: 1 DIF: B OBJ: 18-6

65. ANS:
2-pentene

PTS: 1 DIF: B OBJ: 18-2

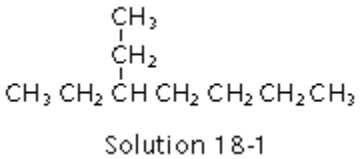
66. ANS:
natural rubber

PTS: 1 DIF: B OBJ: 18-8

67. ANS:
cellulose

PTS: 1 DIF: B OBJ: 18-6

68. ANS:
See Solution 18-1



Solution 18-1

PTS: 1 DIF: B OBJ: 18-1

69. ANS:
$CH_3CH_2CH{=}CHCH_2CH_2CH_3$

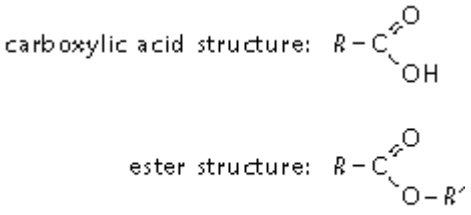
PTS: 1 DIF: B OBJ: 18-1

70. ANS:

$CH_3CH_2CH_2CH_2CH_3$

PTS: 1 DIF: B OBJ: 18-1

71. ANS:
See Solution 18-2. In an ester, the H atom in a carboxylic acid is replaced by *R*', a hydrocarbon group.



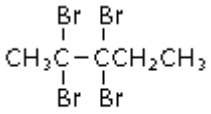
Solution 18-2

PTS: 1 DIF: B OBJ: 18-4

72. ANS:
Ethers are mostly unreactive, insoluble in water, and volatile. Ethers are used as solvents for fats and waxes, and diethyl ether has been used as an anesthetic. Structure: $CH_3CH_2..O..CH_2CH_3$

PTS: 1 DIF: B OBJ: 18-4

73. ANS:
See Solution 18-4.



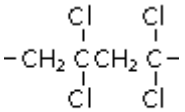
Solution 18-4

PTS: 1 DIF: B OBJ: 18-4

74. ANS:
CH_2=$CHCH_2Cl$

PTS: 1 DIF: B OBJ: 18-4

75. ANS:
See Solution 18-5.



Solution 18-5

PTS: 1 DIF: B OBJ: 18-6