

Organic Chemistry Questions

- ___ 1. Molecules of 1-propanol and 2-propanol have different (1) percentage compositions; (2) molecular masses; (3) molecular formulas; (4) structural formulas.
- ___ 2. Which compound is an organic acid? (1) $\text{CH}_3\text{CH}_2\text{OH}$; (2) CH_3OCH_3 ; (3) CH_3COOH ; (4) $\text{CH}_3\text{COOCH}_3$.
-  3. Each member of the alkane series differs from the preceding member by one additional carbon atom and (1) 1 hydrogen atom; (2) 2 hydrogen atoms; (3) 3 hydrogen atoms; (4) 4 hydrogen atoms.
- ___ 4. Which formula represents a saturated hydrocarbon? (1) C_2H_2 ; (2) C_2H_4 ; (3) C_3H_6 ; (4) C_3H_8 .
- ___ 5. The members of the alkane series of hydrocarbons are similar in that each member has the same (1) empirical formula; (2) general formula; (3) structural formula; (4) molecular formula.
- ___ 6. What could be the name of a compound that has the general formula R-OH ? (1) methanol; (2) methane; (3) methyl methanoate; (4) methanoic acid.
- ___ 7. A compound with the formula C_6H_6 is (1) toluene; (2) benzene; (3) butene; (4) pentene.
- ___ 8. $\text{C}_2\text{H}_4 + \text{H}_2 \rightleftharpoons \text{C}_2\text{H}_6$ The above reaction is an example of (1) addition; (2) substitution; (3) saponification; (4) esterification.
- ___ 9. The compound $\text{C}_4\text{H}_9\text{OH}$ is an isomer of (1) $\text{C}_3\text{H}_7\text{COCH}_3$; (2) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$; (3) $\text{CH}_3\text{COOC}_2\text{H}_5$; (4) CH_3COOH .
- ___ 10. What is the total number of carbon atoms contained in an ethyl group? (1) 1; (2) 2; (3) 3; (4) 4.
- ___ 11. Which compound is a member of the alkane series? (1) C_2H_6 ; (2) C_3H_6 ; (3) C_4H_6 ; (4) C_6H_6 .
- ___ 12. A reaction between an acid and alcohol produces an ester and (1) carbon dioxide; (2) water; (3) glycerol; (4) ethanol.
- ___ 13. The general formula for the alkyne series is (1) C_nH_n ; (2) C_nH_{2n} ; (3) $\text{C}_n\text{H}_{2n+2}$; (4) $\text{C}_n\text{H}_{2n-2}$.
- ___ 14. Which compound represents a member of the benzene series? (1) acetylene; (2) ethylene; (3) toluene; (4) propene.
- ___ 15. Which compound is an isomer of CH_3COOH ? (1) HCOOCH_3 ; (2) $\text{CH}_3\text{CH}_2\text{OH}$; (3) $\text{CH}_3\text{CH}_2\text{COOH}$; (4) $\text{CH}_3\text{COOCH}_3$.
- ___ 16. Which compound is a member of the alkene series? (1) benzene; (2) acetylene; (3) toluene; (4) ethene.
- ___ 17. All carbon-carbon bonds in a saturated hydrocarbon molecule are (1) single

covalent; (2) double covalent; (3) triple covalent; (4) coordinate covalent.

- ___ 18. Which normal alkene has the highest boiling point at 1 atmosphere? (1) C_2H_4 ; (2) C_3H_6 ; (3) C_4H_8 ; (4) C_5H_{10}
- ___ 19. Which reaction produces ethyl alcohol as one of the principal products? (1) an esterification reaction; (2) a neutralization reaction; (3) a saponification reaction; (4) a fermentation reaction.
- ___ 20. Given the following reaction: $C_4H_{10} + Br_2 \rightleftharpoons C_4H_9Br + HBr$. The above reaction is an example of (1) substitution; (2) addition; (3) polymerization; (4) fermentation.
- ___ 21. In a molecule of C_3H_8 , the total number of covalent bonds is (1) 11; (2) 10; (3) 3; (4) 8.
- ___ 22. Which compound is an ester? (1) CH_3COOH ; (2) CH_3CHO ; (3) CH_3COOCH_3 ; (4) CH_3COCH_3 .
- ___ 23. The fermentation of $C_6H_{12}O_6$ will produce carbon dioxide and (1) a polymer; (2) a soap; (3) an ester; (4) an alcohol.
- ___ 24. Compounds which have the same molecular formula but different molecular structures are called (1) isomers; (2) isotopes; (3) allotropes; (4) homologs.
- ___ 25. Which is the formula of a saturated hydrocarbon? (1) C_2H_2 ; (2) C_2H_4 ; (3) C_5H_8 ; (4) C_5H_{12} .
- ___ 26. C_nH_{2n+2} is the general formula of a homologous series. Which is a member with this characteristic? (1) acetylene; (2) benzene; (3) propane; (4) toluene.
- ___ 27. A molecule of ethene is similar to a molecule of methane in that they both have the same (1) structural formula; (2) molecular formula; (3) number of carbon atoms; (4) number of hydrogen atoms.
- ___ 28. Which is the formula for ethanoic acid? (1) CH_3COOH ; (2) CH_3CH_2OH ; (3) CH_3CH_2COOH ; (4) $CH_3CH_2CH_2OH$.
- ___ 29. The compound CH_3COOCH_3 is classified as (1) an acid; (2) an alcohol; (3) an ester; (4) a hydrocarbon.
- ___ 30. Each member in the alkane series of hydrocarbons, when considered in successive order, has 1 more carbon atom and how many more hydrogen atoms? (1) 1; (2) 2; (3) 3; (4) 4.
- ___ 31. Which molecular formula represents pentene? (1) C_4H_8 ; (2) C_4H_{10} ; (3) C_5H_{10} ; (4) C_5H_{12} .
- ___ 32. A molecule of which alcohol contains more than one hydroxyl group? (1) propanol; (2) butanol; (3) pentanol; (4) glycerol.
- ___ 33. Hydrogen bonding is most noticeable in (1) organic acids; (2) esters; (3) alkynes; (4) alkanes.

- ___ 34. Which molecule contains a triple covalent bond? (1) C_2H_2 ; (2) C_2H_4 ; (3) C_3H_6 ; (4) C_3H_8 .
- ___ 35. Which formula represents an acid? (1) CH_3COOCH_3 ; (2) CH_3OH ; (3) CH_3COOH ; (4) $CH_3CH_2CH_3$.
- ___ 36. Ethyl formate can be produced by heating concentrated sulfuric acid, ethyl alcohol and formic acid. This type of reaction is called (1) fermentation; (2) esterification; (3) saponification; (4) polymerization.
- ___ 37. Which formula represents a member of the alkene series? (1) C_3H_6 ; (2) C_2H_6 ; (3) C_2H_2 ; (4) C_6H_6 .
- ___ 38. Ethyne (acetylene) has which one of the following shapes? (1) tetrahedral; (2) planar triangular; (3) linear; (4) bent.
- ___ 39. Compared with organic compounds in general, organic compounds usually have (1) greater solubility in water; (2) a tendency to form ions more readily; (3) more rapid reaction rates; (4) lower melting points.
- ___ 40. Which represents the functional group of an organic acid? (1) $-COOH$; (2) $-OR$; (3) $-CHO$; (4) $-NH_2$.
- ___ 41. $C_3H_6 + H_2 = C_3H_8$ The above reaction is an example of (1) substitution; (2) addition; (3) polymerization; (4) esterification.
- ___ 42. The isomers of propanol differ in (1) the number of carbon atoms; (2) molecular mass; (3) the arrangement of the carbon atoms; (4) the type of functional group.
- ___ 43. Which is the formula of an alcohol? (1) $Ba(OH)_2$; (2) $HCHO$; (3) CH_3COOH ; (4) $C_5H_{11}OH$.
- ___ 44. $C_3H_5(OH)_3$ The above organic compound is classified as (1) a carbohydrate; (2) an ester; (3) an organic acid; (4) an alcohol.
- ___ 45. Which compound can have isomers? (1) C_2H_4 ; (2) C_2H_2 ; (3) C_2H_6 ; (4) C_4H_8 .
- ___ 46. $C_2H_4 + Br_2 = ?$ What reaction occurs when the above chemicals react? (1) polymerization; (2) substitution; (3) addition; (4) esterification.
- ___ 47. Which organic compound is a product of a fermentation reaction? (1) CCl_2F_2 ; (2) C_2H_2 ; (3) C_2H_5OH ; (4) $C_2H_5OC_2H_5$.
- ___ 48. Which organic compound is a product of an esterification reaction? (1) C_3H_8 ; (2) C_3H_7OH ; (3) CH_3COOH ; (4) CH_3COOCH_3 .
- ___ 49. Which organic compound is a product of a saponification reaction? (1) CCl_4 ; (2) $C_3H_5(OH)_3$; (3) C_6H_6 ; (4) $C_6H_{12}O_6$.
- ___ 50. The structure of an alkene contains (1) only single bonds; (2) a double bond; (3) two double bonds; (4) a triple bond.
- ___ 51. As the members of the alkane series increase in molecular mass the magnitude of the van der Waals forces between the molecules (1) decreases; (2) increases;

(3) remains the same.

- ___ 52. Which hydrocarbon has more than one possible structural formula? (1) CH_4 ; (2) C_2H_6 ; (3) C_3H_8 ; (4) C_4H_{10}
- ___ 53. What is the number of hydrogen atoms in a molecule of ethyne? (1) 6; (2) 2; (3) 8; (4) 4.
- ___ 54. In an aqueous solution, which compound will be acidic? (1) CH_3COOH ; (2) $\text{C}_3\text{H}_5(\text{OH})_3$; (3) $\text{CH}_3\text{CH}_2\text{OH}$; (4) CH_3OH .
- ___ 55. A process in which large molecules are broken down into smaller molecules is used commercially to increase the yield of gasoline from petroleum. This process is called (1) polymerization; (2) hydrogenation; (3) esterification; (4) cracking.
- ___ 56. Organic compounds must contain (1) oxygen; (2) nitrogen; (3) hydrogen; (4) carbon.
- ___ 57. The angle formed between any two carbon-hydrogen bonds in a molecule of an organic compound is a(an) (1) dihedral angle; (2) right angle; (3) tetrahedral angle; (4) acute angle.
- ___ 58. A specific arrangement of several atoms which gives characteristic properties to an organic molecule is known as a(an) (1) carboxyl group; (2) functional group; (3) group; (4) alkyl group.
- ___ 59. The ability of the carbon atom to form covalent bonds result in the formation of compounds that are (1) molecular; (2) ionic; (3) polar; (4) atomic.
- ___ 60. How many carbon atoms are in one molecule of 2,3,3-trimethylpentane? (1) 5; (2) 8; (3) 6; (4) 13.
- ___ 61. The series of unsaturated hydrocarbons containing a triple bond shared between two adjacent carbon atoms is known as the (1) alkanes; (2) alkenes; (3) alkynes; (4) benzenes.
- ___ 62. Addition reactions occur in unsaturated hydrocarbons rather than in saturated hydrocarbons because unsaturated hydrocarbons (1) contain multiple bonds; (2) have a greater molecular mass; (3) have tetrahedral bonds; (4) contain more atoms.
- ___ 63. A dihydroxy alcohol that is made from ethane is (1) ethanol; (2) glycerol; (3) ethylene glycol; (4) ethane.
- ___ 64. A long chain protein is an example of a(an) (1) fat; (2) polymer; (3) isomer; (4) monomer.
- ___ 65. Which represents an unsaturated hydrocarbon? (1) C_2H_4 ; (2) C_2H_6 ; (3) C_3H_8 ; (4) C_4H_{10} .
- ___ 66. How many double bonds are in one molecule of 1,3-butadiene? (1) 1; (2) 2; (3) 3; (4) 4.
- ___ 67. Which is an isomer of 2-chloropropane? (1) butane; (2) propane; (3) 1-chlorobutane; (4) 1-chloropropane.

- ___ 68. A fermentation reaction and a saponification reaction are similar in that they both can produce (1) an ester; (2) an alcohol; (3) an acid; (4) a soap.
- ___ 69. Which is a saturated hydrocarbon? (1) C_3H_8 ; (2) C_6H_6 ; (3) C_2H_5OH ; (4) $C_2H_4O_2$.
- ___ 70. Which molecule will have a single pi bond? (1) benzene; (2) propene; (3) propane; (4) propyne.
- ___ 71. CH_3CH_2OH The above organic compound is classified as (1) a carbohydrate; (2) an ester; (3) an alcohol; (4) an organic acid.
- ___ 72. Which organic molecule undergoes resonance? (1) benzene; (2) propyne; (3) methane; (4) ethanol.
- ___ 73. As the molecular mass of the compounds of the alkane series increases their boiling points (1) decreases; (2) increases; (3) remains the same.
- ___ 74. As the number of carbon atoms in the members of the alkene series increases, the ratio of carbon atoms to hydrogen atoms (1) decreases; (2) increases; (3) remains the same.
- ___ 75. Which compound is most likely to react by addition? (1) CH_4 ; (2) C_3H_6 ; (3) C_4H_{10} ; (4) C_5H_{12} .
- ___ 76. Which alcohol contains three hydroxyl groups per molecule? (1) propanol; (2) glycerol; (3) butanol; (4) pentanol.
- ___ 77. Toluene belongs to the same series of hydrocarbons as (1) benzene; (2) propene; (3) pentene; (4) butene.
- ___ 78. A hydrocarbon molecule containing one triple covalent bond is classified as an (1) alkene; (2) alkane; (3) alkyne; (4) alkadiene.
- ___ 79. Both cellulose and proteins are classified as (1) aldehydes; (2) esters; (3) polymers; (4) ketones.
- ___ 80. The compound 2-propanol is classified as a (1) primary alcohol; (2) secondary alcohol; (3) tertiary alcohol; (4) dihydroxy alcohol.
- ___ 81. What is the total number of hydrogen atoms in a molecule of butene? (1) 10; (2) 8; (3) 6; (4) 4.
- ___ 82. Which of the following compounds has the greatest possible number of isomers? (1) butane; (2) ethane; (3) pentane; (4) propane.
- ___ 83. Which is the correct molecular formula of pentene? (1) C_5H_8 ; (2) C_5H_{10} ; (3) C_5H_{12} ; (4) C_5H_{14} .
- ___ 84. The bonds between the atoms in an organic molecule are generally (1) ionic; (2) coordinate covalent; (3) covalent; (4) hydrogen.
- ___ 85. As the length of the chain of carbon atoms in molecules of the alkene series increases, the number of double bonds per molecule (1) decreases; (2) increases;

(3) remains the same.

- ___ 86. In a condensation polymerization, the two products formed are a polymer and (1) water; (2) carbon dioxide; (3) an acid; (4) a base.
- ___ 87. Which is the correct molecular formula of 1,2-ethanediol? (1) C_2H_5OH ; (2) $C_2H_4(OH)_2$; (3) $C_3H_5(OH)_3$; (4) $C_3H_6(OH)_2$.
- ___ 88. In the reaction $C_2H_5OH + CH_3OH \rightarrow C_2H_5OCH_3 + H_2O$, the organic compound formed is (1) an ester; (2) a ketone; (3) an acid; (4) an ether.
- ___ 89. Which compound is a saturated hydrocarbon? (1) ethene; (2) ethane; (3) ethylene; (4) ethyne.
- ___ 90. The compound C_2H_2 belongs to the series of hydrocarbons with the general formula (1) C_nH_n ; (2) C_nH_{2n} ; (3) C_nH_{2n-2} ; (4) C_nH_{2n+2} .
- ___ 91. Which compound is a dihydroxyl alcohol? (1) $Al(OH)_3$; (2) $C_3H_5(OH)_3$; (3) $Ca(OH)_2$; (4) $C_2H_4(OH)_2$.
- ___ 92. The name of the compound having the formula $C_3H_5(OH)_3$ is (1) glycerol; (2) ethylene glycol; (3) propene; (4) propanoic acid.
- ___ 93. Which organic compound is a ketone? (1) CH_3OH ; (2) CH_3COCH_3 ; (3) CH_3COOH ; (4) CH_3COOCH_3 .
- ___ 94. Which of the following compounds has the lowest normal boiling point? (1) butane; (2) ethane; (3) methane; (4) propane.
- ___ 95. Which process increases the yield of gasoline and kerosene from crude oil? (1) oxidation; (2) cracking; (3) Haber; (4) contact.
- ___ 96. Organic compounds that are essentially nonpolar and exhibit weak intermolecular forces have (1) low melting points; (2) low vapor pressure; (3) high conductivity in solution; (4) high boiling points.
- ___ 97. What is the formula for pentanol? (1) C_5H_{12} ; (2) $C_5H_{11}OH$; (3) C_4H_{10} ; (4) C_4H_9OH .
- ___ 98. Which compound is a member of the alkene series of hydrocarbons? (1) benzene; (2) propene; (3) toluene; (4) butadiene.
- ___ 99. Which compound contains a triple bond? (1) CH_4 ; (2) C_2H_2 ; (3) C_3H_6 ; (4) C_4H_{10} .
- ___ 100. Which organic reaction involves the bonding of monomers by a dehydration process? (1) substitution; (2) oxidation; (3) addition polymerization; (4) condensation polymerization.
- ___ 101. In crude petroleum, fractions can be separated according to their differing boiling points by (1) the contact process; (2) the Haber process; (3) fractional distillation; (4) cracking.