



# Chemistry

Name: \_\_\_\_\_

Section \_\_\_\_\_ NAMING HYDROCARBONS WS Date: \_\_\_\_\_

*Directions (1-18): For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question.*

- Which element is composed of atoms that can form more than one covalent bond with one another?  
(1) hydrogen                       (3) carbon  
(2) helium                         (4) calcium
- What is the total number of valence electrons in a carbon atom in the ground state?  
(1) 12                                (3) 6  
(2) 2                                  (4) 4
- Which property is generally characteristic of an organic compound?  
 (1) low melting point  
(2) high melting point  
(3) soluble in polar solvents  
(4) insoluble in nonpolar solvents
- In general, what property do organic compounds share?  
(1) high melting point  
(2) high electrical conductivity  
(3) readily soluble in water  
 (4) slow reaction rate
- A hydrocarbon molecule containing one triple covalent bond is classified as an  
(1) alkene                          (3) alkyne  
(2) alkane                         (4) alkadiene
- What is the total number of hydrogen atoms in a molecule of butene?  
(1) 10                                 (3) 8  
(2) 6                                 (4) 4
- What is the total number of pairs of electrons shared between the two adjacent carbon atoms in an ethyne molecule?  
(1) 1                                  (3) 3  
(2) 2                                 (4) 4
- Which hydrocarbon is a member of the series with the general formula  $C_nH_{2n-2}$ ?  
 (1) ethyne                         (3) butane  
(2) ethene                         (4) benzene
- By how many carbon atoms does each member of a homologous series differ from the previous member?  
 (1) 1                                 (3) 3  
(2) 2                                 (4) 4
- Which of the following is a saturated hydrocarbon?  
(1) alkene                         (3) alkyne  
 (2) alkane                         (4) alkadiene
- All organic compounds contain the element  
(1) hydrogen                         (3) carbon  
(2) nitrogen                        (4) oxygen
- Which compound is a member of the same homologous series as  $C_3H_6$ ?  
 (1)  $C_2H_4$                          (3)  $C_3H_4$   
(2)  $C_2H_6$                          (4)  $C_3H_8$
- Which compound belongs to the alkene series?  
(1)  $C_2H_2$                          (3)  $C_6H_6$   
 (2)  $C_2H_4$                          (4)  $C_6H_{14}$
- Which type of bond occurs in a saturated hydrocarbon molecule?  
 (1) single covalent                (3) triple covalent  
(2) double covalent               (4) ionic
- Which formula represents butane?  
(1)  $CH_3CH_3$   
(2)  $CH_3CH_2CH_3$   
 (3)  $CH_3CH_2CH_2CH_3$   
(4)  $CH_3CH_2CH_2CH_2CH_3$

16 The four single bonds of a carbon atom are directed in space toward the corners of a

- (1) regular tetrahedron
- (2) regular octahedron
- (3) square plane
- (4) trigonal bipyramid

17 Which type of bonds and solids are characteristic of organic compounds?

- (1) ionic bonds and ionic solids
- (2) ionic bonds and molecular solids
- (3) covalent bonds and ionic solids
- (4) covalent bonds and molecular solids

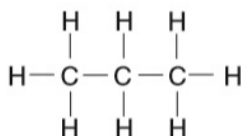
18 In which group could the hydrocarbons all belong to the same homologous series?

- (1)  $C_2H_2$ ,  $C_2H_4$ ,  $C_2H_6$
- (2)  $C_2H_4$ ,  $C_3H_4$ ,  $C_4H_8$
- (3)  $C_2H_4$ ,  $C_2H_6$ ,  $C_3H_6$
- (4)  $C_2H_4$ ,  $C_3H_6$ ,  $C_4H_8$

### Naming Hydrocarbons:

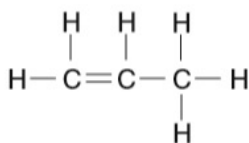
Name the following compounds according to IUPAC nomenclature.

1.



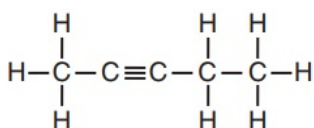
propane

2.



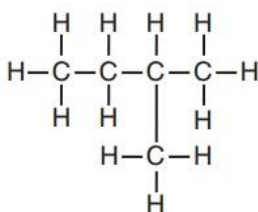
propene

3.



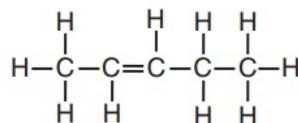
2-pentyne

4.



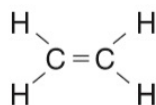
2-methyl butane

5.



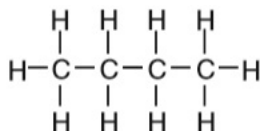
2-pentene

6.



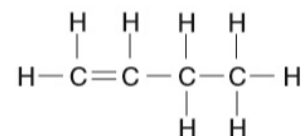
ethene

7.



butane

8.



1-butene

## Drawing Hydrocarbon Structural Formulas:

Draw structural formulas for the following compounds.

<p>butane</p> $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	<p>ethyne</p> $\text{H}-\text{C}\equiv\text{C}-\text{H}$
<p>1-butene</p> $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & =\text{C} & -\text{C} & -\text{C}-\text{H} \\ & &   &   \\ & & \text{H} & \text{H} \end{array}$	<p>2-butyne</p> $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & -\text{C} & =\text{C} & -\text{C}-\text{H} \\   & & &   \\ \text{H} & & & \text{H} \end{array}$
<p>2-methyl butane</p> $\begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   \\ \text{H} & \text{H} &   & \text{H} \\ & & \text{H}-\text{C}-\text{H} & \\ & &   & \\ & & \text{H} & \end{array}$	<p>2,2-dimethyl butane</p> $\begin{array}{cccc} & & \text{H} & \\ & &   & \\ & & \text{H}-\text{C}-\text{H} & \\ & &   & \\ \text{H} & \text{H} &   & \text{H} \\   &   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   \\ \text{H} & \text{H} &   & \text{H} \\ & & \text{H}-\text{C}-\text{H} & \\ & &   & \\ & & \text{H} & \end{array}$
<p>3-ethyl heptane</p> $\begin{array}{ccccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   &   &   &   \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   &   &   &   \\ \text{H} & \text{H} &   & \text{H} & \text{H} & \text{H} & \text{H} \\ & & \text{H}-\text{C}-\text{H} & & & & \\ & &   & & & & \\ & & \text{H}-\text{C}-\text{H} & & & & \\ & &   & & & & \\ & & \text{H} & & & & \end{array}$	<p>2,3-dimethyl pentane</p> $\begin{array}{ccccccc} & & \text{H} & & & & \\ & &   & & & & \\ & & \text{H}-\text{C}-\text{H} & & & & \\ & &   & & & & \\ \text{H} & \text{H} &   & \text{H} & \text{H} & \text{H} & \\   &   &   &   &   &   & \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\   &   &   &   &   &   \\ \text{H} & \text{H} &   & \text{H} & \text{H} & \text{H} \\ & & \text{H}-\text{C}-\text{H} & & & & \\ & &   & & & & \\ & & \text{H} & & & & \end{array}$