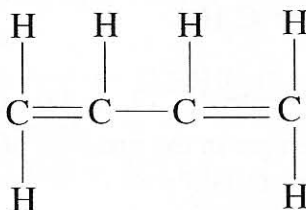


Teacher Notes on Chapter 6

Although a thorough understanding of Organic Chemistry and its myriad of functional groups and nomenclature is not currently required for the AP Chemistry exam, some knowledge of organic basics can come in handy on the reaction prediction section. Most notably, hydrocarbon combustion equations are not difficult to predict if students are able to write formulas for basic alkanes and alcohols. Also, organic compounds are used throughout the exam in various examples. A simple introduction to organic chemistry will familiarize students so that they feel comfortable (and will not avoid) doing problems with an organic basis.

Answers for the questions in Chapter 6:

The structural formula for 1,3-butadiene is



Exercise 6-1: Using condensed formulas provided, name the following hydrocarbon compounds. It may be helpful to draw the structural formula first.

- | | |
|--|--------------------------------|
| 1. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$ | 2 - methylpentane |
| 2. $\text{CH}_3\text{CH}(\text{C}_2\text{H}_5)\text{CH}_2\text{CH}_3$ | 3 - methylpentane |
| 3. $\text{CH}_3\text{CH}_2\text{CHClCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$ | 1,5 - dichloroheptane |
| 4. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ | 1 - butanol |
| 5. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ | pentanoic acid |
| 6. $\text{CH}_2=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$ | 2,4 - dimethyl - 1 - pentene |
| 7. $(\text{CH}_3)_2\text{CHCl}$ | 2 - chloropropane |
| 8. $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}_3$ | 2,2,4,4 - tetramethylheptane |
| 9. $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}=\text{C}(\text{CH}_3)\text{CH}_2\text{CH}_3$ | 2,2,4 - trimethyl - 3 - hexene |
| 10. $\text{CH}_3\text{C}\equiv\text{CCH}_3$ | 2 - butyne |

Exercise 6-2: Draw the condensed formula for each of the following compounds.

- | | |
|----------------------------------|--|
| 1. 2,3 - dimethyl - 2 - butene | $\text{CH}_3\text{C}(\text{CH}_3)=\text{C}(\text{CH}_3)\text{CH}_3$ |
| 2. 4 - ethyl - 2 - hexyne | $\text{CH}_3\text{C}\equiv\text{CCH}(\text{C}_2\text{H}_5)\text{CH}_2\text{CH}_3$ |
| 3. 3,3,6 - trimethylnonane | $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$ |
| 4. 3 - ethyl - 4 - propylheptane | $\text{CH}_3\text{CH}_2\text{CH}(\text{C}_2\text{H}_5)\text{CH}(\text{C}_3\text{H}_7)\text{CH}_2\text{CH}_2\text{CH}_3$ |
| 5. 3 - octanol | $\text{CH}_3\text{CH}_2\text{CHOHCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ |
| 6. 2 - methyl - 2 - pentene | $\text{CH}_3\text{C}(\text{CH}_3)=\text{CHCH}_2\text{CH}_3$ |
| 7. 5 - methyl - 1 - hexene | $\text{CH}_2=\text{CHCH}_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$ |
| 8. 2,2,4,5 - tetramethylhexane | $\text{CH}_3\text{C}(\text{CH}_3)_2\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)\text{CH}_3$ |
| 9. propanoic acid | $\text{CH}_3\text{CH}_2\text{COOH}$ |
| 10. 2 - pentyne | $\text{CH}_3\text{C}\equiv\text{CCH}_2\text{CH}_3$ |

ROUND 1

Exercise 6–3: Predict and balance the following organic reactions.

1. Ethanol (ethyl alcohol) is burned completely in air.



2. Propane gas is heated with chlorine gas.



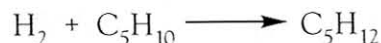
3. Ethanol (ethyl alcohol) and methanoic acid (formic acid) are mixed and warmed.



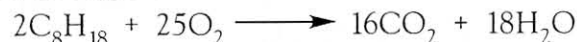
4. Ethene gas is bubbled through a solution of bromine.



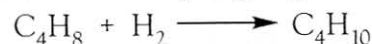
5. Hydrogen gas is added to 2-pentene.



6. Octane is burned in oxygen.



7. 2-butene is combined with hydrogen gas in the presence of a nickel catalyst.



8. Ethanoic acid is combined with propanol.



9. An excess of chlorine gas is added to pure ethyne (acetylene) gas.



10. A limited amount of liquid bromine is added to an excess of benzene (C_6H_6).

