

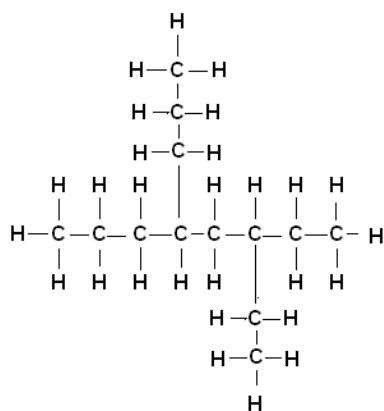
**Organic Chemistry 17.1**  
**Naming Alkanes and Structural Isomerism**  
**Worksheet**

Write balanced chemical equations for the reactions outlined in question 1 through 3.

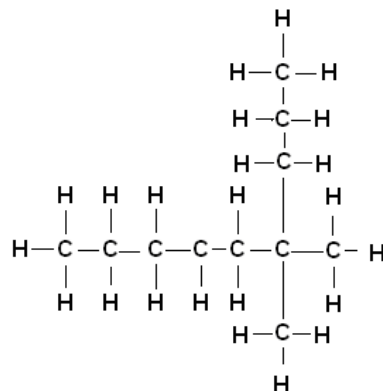
- 1) Methane is burned in air.
- 2) Butane is burned in air.
- 3) Octane is burned in the presence of oxygen gas.
- 4) Draw the complete structural formula for each of the following. Show all bonds and atoms.
  - a. Ethane
  - b. 3-methylhexane
  - c. 4-ethyl-2-methylheptane
  - d. 1-ethyl-2-propylcyclopentane
  - e. 1-butyl-3-methylcyclohexane

5) Name the following structures.

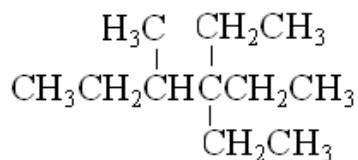
a.



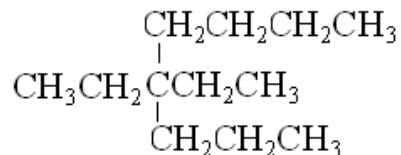
b.



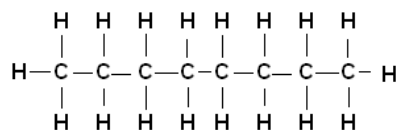
c.



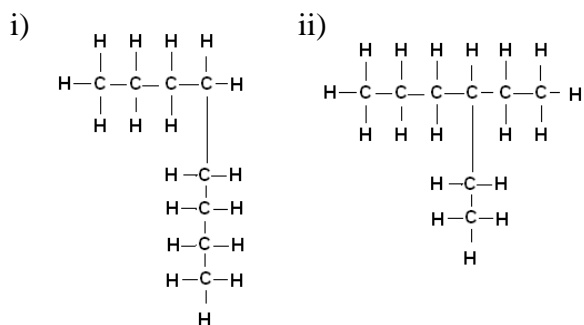
d.



6) The complete structural formula for octane is shown here.



- Which of the diagrams below **is not** considered to be an isomer of octane?
- Give the name for each structure.



7) Which set(s) of structures are considered to be isomers?

- $$\begin{array}{c}
 \text{CH}_3\text{CH}_2\text{CHCH}_3 \\
 | \\
 \text{CH}_3
 \end{array}
 \qquad
 \begin{array}{c}
 \text{CH}_3 \\
 | \\
 \text{CH}_3\text{CHCH}_2\text{CH}_3
 \end{array}$$
- $$\begin{array}{ccc}
 \text{H} & \text{H} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{F} \\
 | & | & | \\
 \text{H} & \text{H} & \text{H}
 \end{array}
 \qquad
 \begin{array}{ccc}
 \text{H} & \text{H} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\
 | & | & | \\
 \text{H} & \text{H} & \text{F}
 \end{array}$$
- $$\begin{array}{ccc}
 \text{H} & \text{H} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{F} \\
 | & | & | \\
 \text{H} & \text{H} & \text{H}
 \end{array}
 \qquad
 \begin{array}{ccc}
 \text{H} & \text{H} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\
 | & | & | \\
 \text{F} & \text{H} & \text{H}
 \end{array}$$
- $$\begin{array}{ccc}
 \text{H} & \text{F} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\
 | & | & | \\
 \text{H} & \text{H} & \text{H}
 \end{array}
 \qquad
 \begin{array}{ccc}
 \text{H} & \text{H} & \text{H} \\
 | & | & | \\
 \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\
 | & | & | \\
 \text{F} & \text{H} & \text{H}
 \end{array}$$