

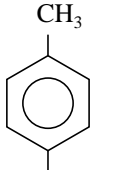
Unit 1 Organic Chemistry

ARE YOU READY?

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Understanding Concepts

- (a) 3,3-dimethylpentane
(b) 1-methyl-4-propylcyclohexane
- (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
(b)
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$$

(c) 
(d)
$$\begin{array}{c} \text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3 \\ | \\ \text{CH}_3\text{CHCH}_2\text{CH}_2\text{CH}=\text{CH}_2 \end{array}$$

(e) $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$
- $\text{C}_7\text{H}_{16} + 11 \text{O}_2 \rightarrow 7 \text{CO}_2 + 8 \text{H}_2\text{O}$
- Cyclohexane (a) and 2,3-dimethyl-2-butene (d) are structural isomers; cyclohexene (b) and hexyne (c) are structural isomers.
- Pentane would have a higher boiling point because it has a long carbon chain allowing more van der Waals attractions between molecules. The 2,2-dimethylpropane has a more spherical shape, with fewer intermolecular attractions. More energy is required to separate molecules with stronger intermolecular attractions, and thus, these compounds have higher boiling points.
- 2,2-dihydroxyethane, (a), will have a greater solubility in water than does methylbenzene, (b).
- H, (C, S), (N, Cl), O
- (a) intramolecular: single covalent bonds; intermolecular: van der Waals
(b) intramolecular: single covalent bonds; intermolecular: van der Waals forces and hydrogen bonds
(c) intramolecular: single covalent bonds; intermolecular: van der Waals forces and hydrogen bonds
- Liquid 1 is 2-methylbutane; liquid 2 is 2-methyl-2-butene; liquid 3 is pentane.
- (a) The safety precautions needed are as follows: wear eye protection and a lab apron; avoid direct contact with skin (if in contact with skin, wash with copious amounts of water); when diluting concentrated acids, add acid to water; handle concentrated acids in a fume hood; store in glass or plastic container in secure location.
(b) The safety precautions needed are as follows: wear eye protection and a lab apron; do not use with open flames; store in secure location.