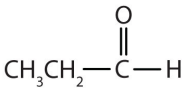
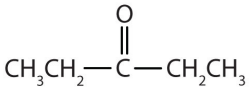
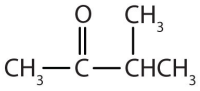
4.E: Carbonyl-Containing Compounds (Exercises)

Additional Exercises

1. Name each compound.

a. 

b. 

c. 

2. Draw the structure for each compound.
   a. butyraldehyde
   b. 2-hexanone
   c. *p*-nitrobenzaldehyde

3. Which compound in each pair has the higher boiling point?
   a. hexanal or 2-hexanol
   b. butane or 2-propanone

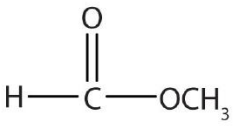
4. Draw the structure for each compound.
   a. *o*-nitrobenzoic acid
   b. *p*-chlorobenzoic acid
   c. 3-chloropentanoic acid
   d. α-chloropropionic acid

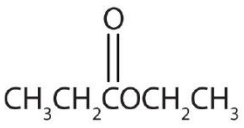
5. Name each compound with either the IUPAC name, the common name, or both.
   a. $(CH_3)_2CHCH_2COOH$
   b. $(CH_3)_3CCH(CH_3)CH_2COOH$
   c. $CH_2BrCH_2CH_2COOH$

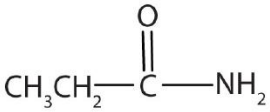
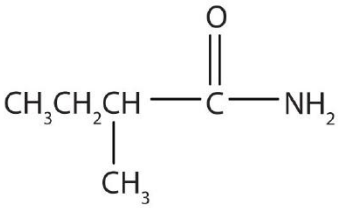
6. Which compound has the higher boiling point: 1-pentanol or butanoic acid? Explain.

7. Which compound is more soluble in water: propanoic acid or hexanoic acid? Explain.

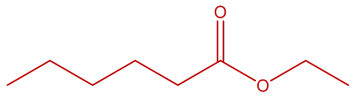
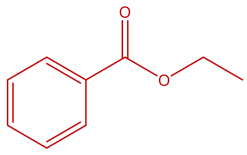
8. Name each compound with both the common name and the IUPAC name.

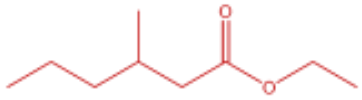
a. 

b. 

9. Draw the structure for each compound.
    a. ethyl hexanoate
    b. ethyl benzoate
    c. ethyl 3-methylhexanoate
10. Which compound has the higher boiling point: 1-octanol or ethyl hexanoate? Explain.
11. Which compound is more soluble in water: methyl ethanoate or propanoic acid? Explain.
12. Draw the structure for each compound.
    a. propionamide
    b. butanamide
13. Name each compound with the common name, the IUPAC name, or both.
    a. 
    b. 
14. Which compound has the higher boiling point—butyramide or dimethylacetamide? Explain.
15. Which compound is more soluble in water: N-methylethanamide or 2-methylbutane? Explain.

Answers

1. a. IUPAC: propanal; Common: propionaldehyde
    b. IUPAC: 3-pentanone; Common: diethyl ketone
    c. IUPAC: 3-methyl-2-butanone; Common: isopropyl methyl ketone
3. a. 2-hexanol
    b. 2-propanone
5. a. IUPAC: 3-methylbutanoic acid; Common: β-methylbutyric acid
    b. IUPAC: 3,4,4-trimethylpentanoic acid; no common name
    c. IUPAC: 4-bromobutanoic acid; Common: γ- bromobutyric acid
7. Propanoic acid because both molecules can form hydrogen bonds, but this compound is more polar. As the carbon chain length increases because dipole forces become less important and dispersion forces become more predominant.
9. a. 
    b. 

c. 

11. Propanoic acid because it can form hydrogen bonds with water.

13. a. common: propionamide; IUPAC: propanamide
    b. common: α-methylbutyramide; IUPAC: 2-methylbutanamide

15. N-methylethanamide because it can form hydrogen bonds with water.
