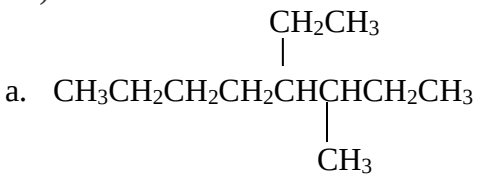
CHEM 1312
Practice Set
Organic

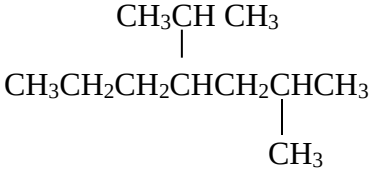
1. (23.41) Describe the structure of the functional group in each of the following families:
   a. Alkene
   b. Alcohol
   c. Ester
   d. Amine

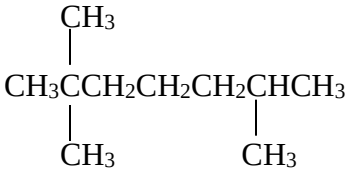
2. (23.42) Propose structures for molecules that meet the following descriptions:
   a. A ketone with the formula $C_5H_{10}O$
   b. An ester with the formula $C_6H_{12}O_2$
   c. A compound with formula $C_2H_5NO_2$ that is both an amine and a carboxylic acid

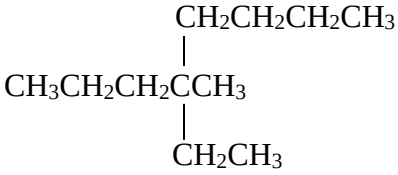
3. (23.43) Write structures for each of the following molecular formulas. Rings and/or multiple bonds may be needed in some instances.
   a. C_2H_7N
   b. C_4H_8
   c. C_2H_4O
   d. CH_2O_2

4. (23.50) Give the IUPAC names of the following alkanes:

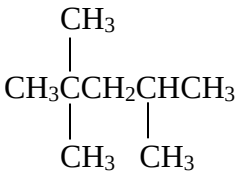
   a. 

   b. 

   c. 

   d. 

5. (23.51) The following compound known commonly as isooctane, is used as a reference substance for determining the octane rating of gasoline. Give the IUPAC name for this substance.

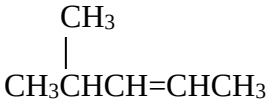


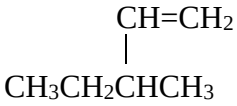
6. (23.52) Write condensed structures for each of the following compounds:
   a. 3-Ethylhexane
   b. 2,2,3-Trimethylpentane
   c. 3-Ethyl-3,4-dimethylheptane
   d. 5-Isopropyl-2-methyloctane

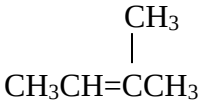
7. (23.53) Draw structures corresponding to the following IUPAC names:
   a. Cyclooctane
   b. 1,1-Dimethylcyclopentane
   c. 1,2,3,4-Tetramethylcyclobutane
   d. 4-Ethyl-1,1-dimethylcyclohexane

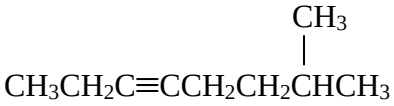
8. (23.56) Write structural formulas for compounds that meet the following requirements:
   a. An alkene with five carbons
   b. An alkyne with four carbons
   c. A substituted aromatic compound with eight carbons

9. (23.58) Give IUPAC names for the following:

   a. 

   b. 

   c. 

   d. 

10. (23.59) Draw structures corresponding to the following IUPAC names:
    a. *cis*-2-Hexene
    b. 2-Methyl-3-hexene
    c. 2-Methyl-1,3-butadiene

11. (23.60) Determine which of the following compound are capable of cis-trans isomerism:
    a. 1-Hexene b. 2-Hexene c. 3-Hexene

12. (23.62) Write equations for the reaction of 2,3-dimethyl-2-butene with the following:
    a. H_2 and Pd catalyst
    b. Br_2
    c. H_2O and H_2SO_4 catalyst

13. (23.64) Draw structure corresponding to the following names:
    a. 2,4-Dimethyl-2-pentanol
    b. 2,2-Dimethylcyclohexanol
    c. 5,5-Diethyl-1-heptanol
    d. 3-Ethyl-3-hexanol

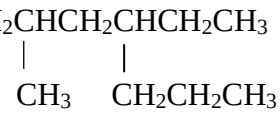
14. (23.65) Draw structures corresponding to the following names:
    a. Propylamine
    b. Diethylamine
    c. *N*-Methylpropylamine

15. (23.66) Determine the difference in structure between an aldehyde and a ketone.

16. Give the structural formula of:
    a. 2,2,3,3-tetramethylpentane
    b. 2,3-dimethylbutane
    c. 3,4,4,5-tetramethylheptane
    d. 4-ethyl-3,4-dimethylheptane
    e. 4-ethyl-2,4-dimethylheptane
    f. 2,5-dimethylhexane
    g. 3-ethyl-2-methylpentane
    h. 2,2,4-trimethylpentane
    i. 3-chloro-2-methylpentane
    j. 1,2-dibromo-2-methylpropane

17. Draw out the structural formula and give the IUPAC name of:

a. $(CH_3)_2CHCH_2CH_2CH_3$
b. $CH_3CBr_2CH_3$
c. $CH_3CH_2C(CH_3)_2CH_2CH_3$
d. $(C_2H_5)_2C(CH_3)CH_2CH_3$
e. $CH_3CH_2CH(CH_3)CH(CH_3)CH(CH_3)_2$
g. $(CH_3)_3CCH_2C(CH_3)_3$
h. $(CH_3)_2CClCH(CH_3)_2$
i. $(CH_3)_2CHCH_2CH_2CH(C_2H_5)_2$
j. $(CH_3)_2CHCH(CH_3)CH_2C(C_2H_5)_2CH_3$
k. $(CH_3)_2\ CHC(C_2H_5)_2CH_2CH_2CH_3$

f.


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