The *Complete* Organic Chemistry Worksheet

The Complete Organic Chemistry Worksheet.doc

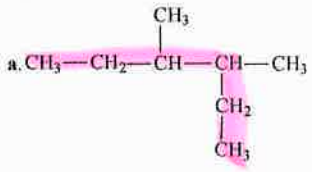
Name Answers

Date

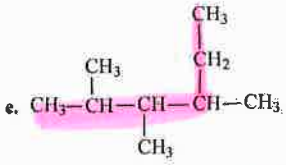
Period

1. Name the following hydrocarbons.

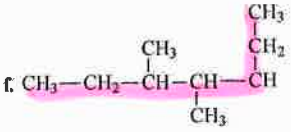
3,4-dimethylhexane

a. 

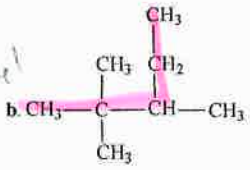
2,3,4-trimethylhexane

e. 

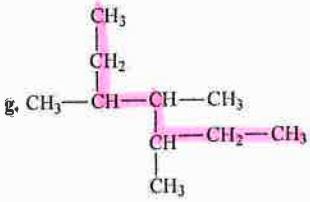
3,4-dimethylheptane

f. 

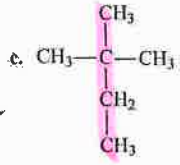
2,2,3-trimethylpentane

b. 

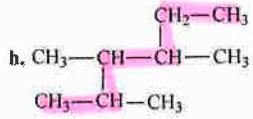
3,4,5-trimethylheptane

g. 

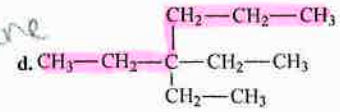
2,2-dimethylbutane

c. 

2,3,4-trimethylhexane

h. 

3,3-diethylhexane

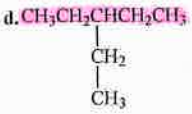
d. 

2. Name the following hydrocarbons.

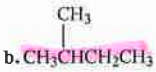
2-methylpentane

a. 

3-ethylpentane

d. 

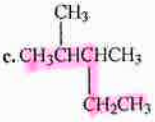
2-methylbutane

b. 

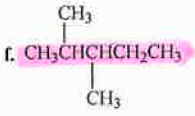
2,4-dimethylpentane

e. 

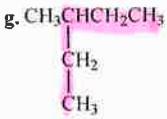
2,3-dimethylpentane

c. 

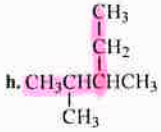
2,3-dimethylpentane

f. 

3-methylpentane

g. 

2,3-dimethylpentane

h. 

3. Listed below are the condensed structural formulas or names of the nine isomers of heptane, C_7H_{16}. Write the formula and name for each.

all C_7H_{16}

heptane

a. $CH_3CH_2CH_2CH_2CH_2CH_2CH_3$

2,4-dimethylpentane

b. $CH_3CHCH_2CHCH_3$ (CH_3 on each CH)

2,2,3-trimethylbutane

c. $CH_3C(CH_3)(CH_3)CHCH_3$ (CH_3)

f. $CH_3CH_2CHCH_2CH_2CH_3$ (CH_3) — 3-methylhexane

g. $CH_3CCH_2CH_2CH_3$ (CH_3, CH_3) — 2,2-dimethylpentane

h. 2-methylhexane

i. 3-ethylpentane

4. Name (use common and systematic for benzene if appropriate) the compounds represented by the following formulas.

2-pentene

a. $CH_3CH{=}CHCH_2CH_3$

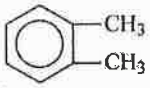
cyclohexane

c.

cyclobutane

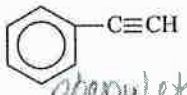
e.

b.



1,2-dimethylbenzene

d.



phenylethyne

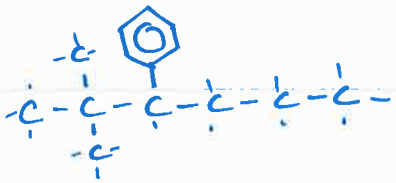
f. $CH{\equiv}CCH_3$ — propyne

5. Draw the structural formulas for the following:

a. 3-heptyne

b. cyclopentene

c. 3-phenyl-2,2-dimethylhexane

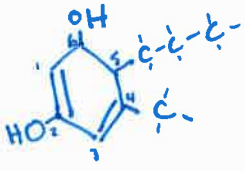


d. 1,3-butadiene

e. 1-ethyl-2-methylbenzene

f. 2,4-dimethyl-2-pentene

g.



correct name:

2,6-dihydroxy-4-methyl-5-propyl-1,3-cyclohexadiene

6. Listed below are the condensed structural formulas or the names for the eight isomers of $C_5H_{11}Cl$. Write either formula and the name for each.

1-chloropentane

a. $CH_3CH_2CH_2CH_2CH_2Cl$

b. $CH_3CHCH_2CH_2Cl$ (1-chloro-3-methyl butane)

c. 2-chloropentane

d. 2-chloro-2-methylbutane

e. $CH_3CH_2CHCH_2CH_3$ (3-chloropentane)

f. $CH_3CH(Cl)CHCH_3$ (2-chloro-3-methylbutane)

g. 1-chloro-2-methylbutane

h. 1-chloro-2, 2-dimethylpropane

7. Name the following compounds.

a. $CH_3CH_2CCH_2CH_2Br$ (1-bromo-3-methyl-3-ethylpentane)

b. $CH_2=CHCHCH=CH_2$ (3-methyl-1,4-pentadiene)

c. $CH_2=CHCCH_3$ (3,3-dimethyl-1-butene)

d. C_6H_5Cl chlorobenzene

e. $CH_3CH=CHCH_2CH_3$

f. $CH_3C=CHCH_3$

g. $CH_3CH_2CH=CH_2$

h. $CH_3CHCH=CHCH_3$ (4-methyl-2-pentene)

i. $CH_3C=CCH_2CH_3$ (2,3-dimethyl pentene)

j. $CH_2=CCH_2C=CH_2$ (2,4-dimethyl-1,4-pentadiene)

k. $CH_2=C-C-CH=CHCH_3$ (2,3,3-trimethyl-1,4-hexadiene)

l. propyl ethanoate

m. 2-ethoxy butane

n. methyl-2-methyl butanoate

8. Draw structural formulas for the following.

a. 3-heptene

b.

c. trichloromethane ($CHCl_3$)

d. 2-chloro-3-phenylhexane

e. 1,3-cyclopentadiene

f. toluene (methylbenzene)

g. 1,4-dibromobenzene

h. 2-bromo-3-methyl-2-butene

i.

j.

k.

l.

m.

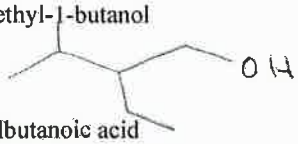
n.

9. Write structural formulas for the following compounds.

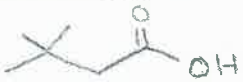
a. 2-chlorobutane

b. 2-butene

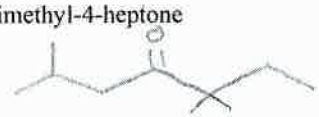
c. 2-ethyl-3-methyl-1-butanol



d. 3,3-dimethylbutanoic acid

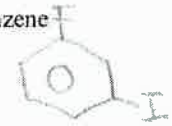


e. 2,5,5-trimethyl-4-heptone



f. 1,8-nonadiyne

g. 1,3-diiodobenzene

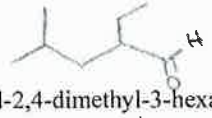


h. ethoxybenzene

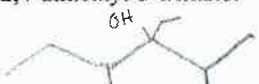
i. 1-butanol

j. 3-methyl-2-pentene

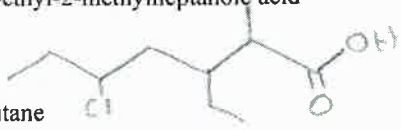
k. 2-ethyl-4-methylpentanal



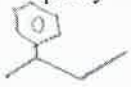
l. 3-ethyl-2,4-dimethyl-3-hexanol



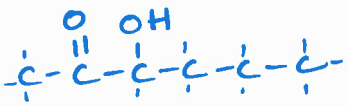
m. 5-chloro-3-ethyl-2-methylheptanoic acid



n. 2-phenylbutane



o.



p. 4-bromobenzoic acid

10. Name the following organic compounds.

a. $CH_3CH(CH_3)CH(OH)CH_2CH_3$ — 2-methyl-3-pentanol

b. $CH_3CH_2C(=O)CH(CH_3)CH_3$ — 3-methyl-4-pentanone

c. $CH_3CH(CH_3)CH=CH_2$ — 3-methyl-1-butene

d. $CH_3CH_2CH_2C(=O)H$ — butanal

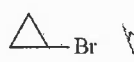
e. $CH_3C(CH_3)_2CH_2CH_2OH$ — 4,4-dimethyl-1-pentanol

f. $CH_2=CHC(CH_3)(OH)CH=CHCH_3$ — 3-methylhexa-1,4-diene-3-ol or 3-hydroxy-3-methyl-1,4-hexadiene

11. Name the following organic compounds.

a. $CH_3CH_2CH(CH_3)CH_2Cl$ — 1-chloro-2-methyl butane

b. $CH_3C(CH_3)_2CH(CH_3)CH_2Br$ — 1-bromo-2,3,3-trimethyl butane

c.  — bromocyclopropane

d. $CH_3CH_2CH(Cl)CH_2CH_3$ — 3-chloropentane

e. $CH_3C(CH_3)(OH)CH_2CH_3$ — 2-methyl-2-butanol

f. $CH_3CH_2C(Br)=CHCH_3$ — 3-bromo-2-pentene

g. $CH_3(CH_2)_2CH_2NH_2$ — butanamine

h. $H_2NC(=O)CH_2CH_3$ — propanamide

12. Each of the following formulas can be written as two compounds with different functional groups. Write the structural formulas, name the compounds, and identify the functional groups.

a. C_2H_6O

CH_3-CH_2-OH ethanol

CH_3-O-CH_3 methoxymethane

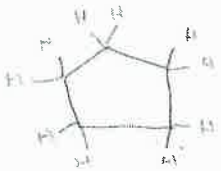
b. C_3H_6O

$CH_3-CH_2-C(=O)H$ propanal

$CH_3-C(=O)-CH_3$ 2-propanone

c. C_5H_{10}

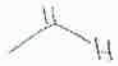
$CH_3-CH_2-HC=CH-CH_3$ pentene

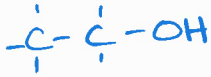
 cyclopentane

6.

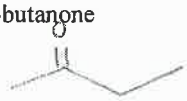
13. Draw structural formulas for the following.

a. Ethanal

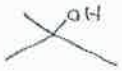




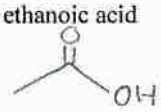
b. 2-butanone



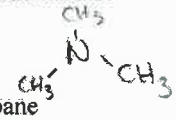
c. 2-methyl-2-propanol



d. ethanoic acid



e. trimethanamine

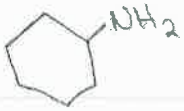


f. propane

g. 2-pentyne

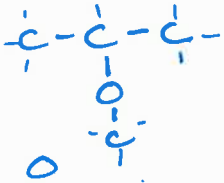
h. cyclobutane

i. cyclohexanamine

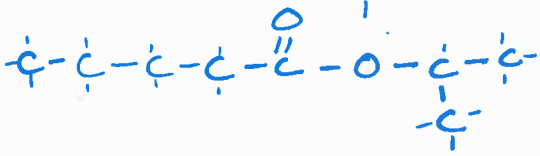


j. 2-aminopentane

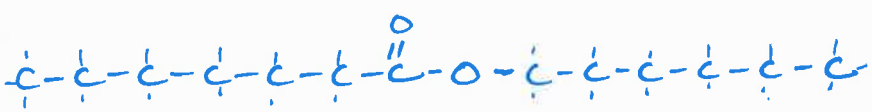
k.



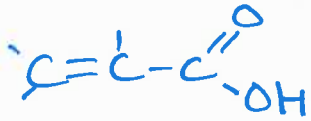
l.



m.



n. propenoic acid



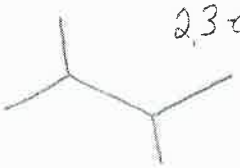
14. Draw and name the five structural isomers of hexane (C_6H_{14})

hexane

2-methylpentane

3-methylpentane

2,3-dimethyl butane



2,2-dimethyl butane

15. Draw the structural formula for each of the following.

a. 2-Methylpentane

b. 2,2,4-Trimethylpentane, also called *isooctane*. This compound is the reference for octane ratings for gasoline.

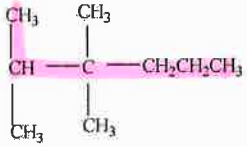
c. 2-~~tert~~-Butylpentane

correct name:
4-methyl octane

d. The name given in part c is incorrect. Give the correct name for this hydrocarbon.

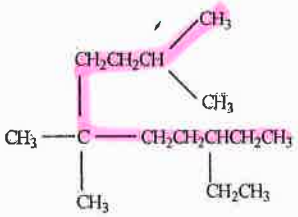
16. Name each of the following:

a.



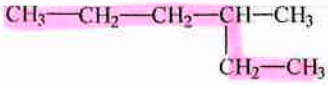
2,3,3-trimethylhexane

b.



2,5,5-trimethyl-8-ethyldecane

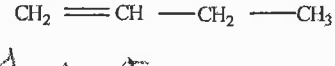
c.



3-methylhexane

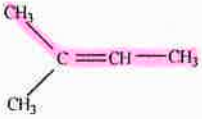
17. Name each of the following alkenes.

a.



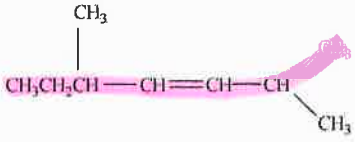
1-butene

b.



2-methyl-2-butene

c.



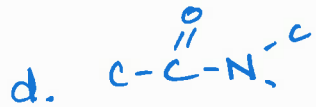
2,5-dimethyl-3-heptene

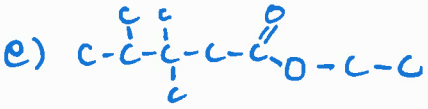
18. Give the structure for each of the following:

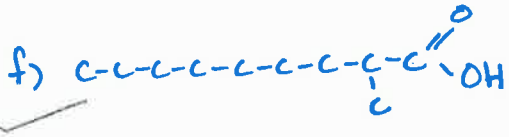
a. 3-hexene 

b. 2,4-Heptadiene 

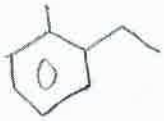
c. 2-Methyl-3-octene 

d. 

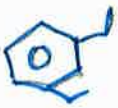
e) 

f) 

19. Give the structure for each of the following aromatic hydrocarbons.

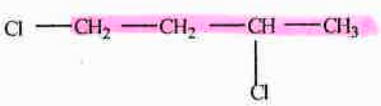
a. o 

b. p-dibutylbenzene 

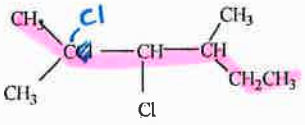
c. m-Diethylbenzene 

d. 1-Phenyl-2-butene 

20. Name each of the following:

a.  1,3-dichlorobutane

b. $CH_3CH_2CH_2CCl_3$ 1,1,1-trichlorobutane

c.  2,3-dichloro-2,4-dimethyl-hexane

d. N-ethylpropanamide

e. N-ethyl-N-methylpropanamine