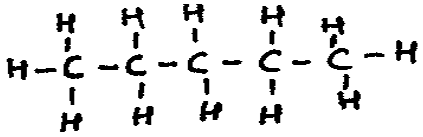
CH1020

Organic Chemistry Naming

1. Give the name, molecular and structural formula of a hydrocarbon containing ***five*** carbon atoms that is

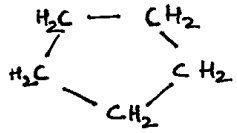
   a. an alkane

   Pentane, C_5H_{12}



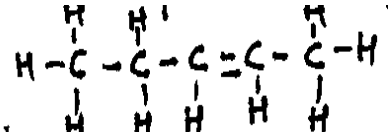
   b. a cycloalkane

   cyclopentane, C_5H_{10}



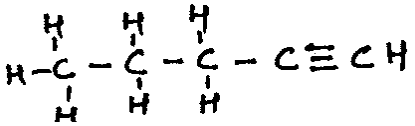
   c. an alkene

   2-pentene, C_5H_{10}



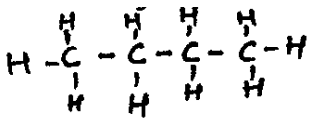
   d. an alkyne

   1-pentyne, C_5H_8



2. Based on the molecular formula, determine whether each compound is an alkane, alkene, or alkyne. (assume that the hydrocarbons are noncyclical and there is no more than one multiple bond.)
   a. C_8H_{16} ***alkene***
   b. C_4H_6 ***alkyne***
   c. C_7H_{16} ***alkane***
   d. C_2H_2 ***alkyne***

3. Write the ***structural formula*** for the following alkanes:
   a. butane



   b. nonane

   $CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_2CH_3$

(This is the condensed formula. Show each C-H bond similar to answer for 3a, to write the structural formula.

c. hexane

$CH_3CH_2CH_2CH_2CH_2CH_3$

(This is the condensed formula. Show each C-H bond similar to answer for 3a, to write the structural formula.

d. octane

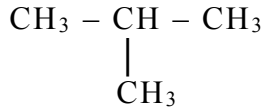
$CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3$

(This is the condensed formula. Show each C-H bond similar to answer for 3a, to write the structural formula.

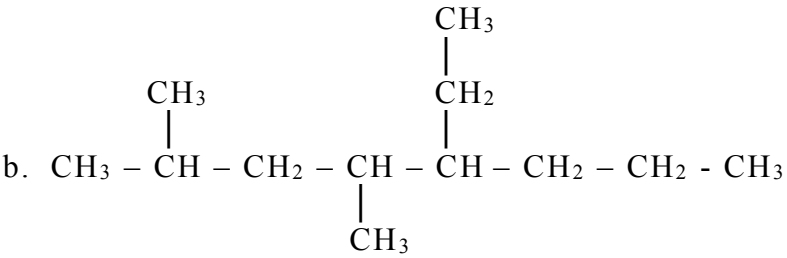
4. What is ***wrong*** with the condensed structural formula? $CH_3{=}CHCH_2CH_3$

The carbon in bold red has 5 bonds. Carbon should have 4 bonds.

5. Name the following:

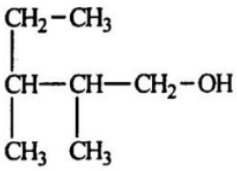
a. 

2-methyl propane

b. 

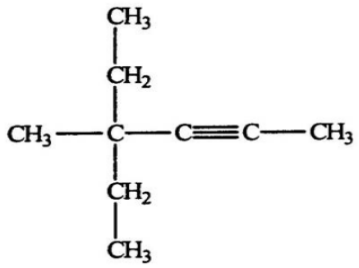
5-ethyl-2,4-dimethyloctane

c.



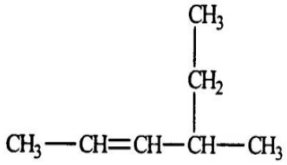
2,3-dimethyl-1-pentanol

d.



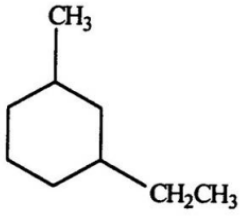
4-ethyl-4-methyl-2-hexyne

e.



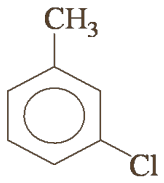
4-methyl-2-hexene

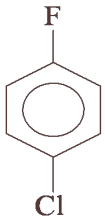
f.

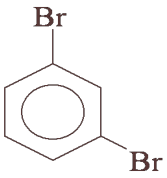


1-ethyl-3-methylcyclohexane

6. Name each disubstituted benzene:

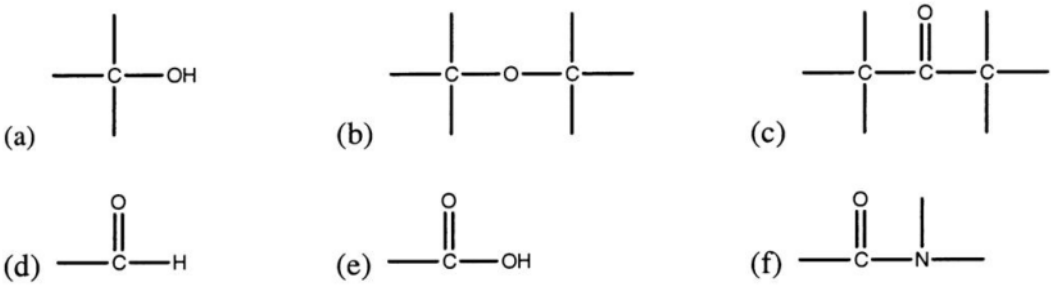






1-chloro-3-methyl benzene ***1-chloro-4-fluorobenzene*** ***1,3-dibromobenzene***

7. Name each of the following functional groups:



a. Alcohol ***b. ether*** ***c. ketone***

d.aldehyde ***e. carboxylic acid*** ***f. amide***

8. Identify the ***functional groups*** and name each of the following compounds:

$CH_3CCH_2CH_3$ (O double-bonded to the second C)

Ketone
2-butanone

$CH_3C{=}O$ (OH single-bonded to C)

carboxylic acid
Ethanoic acid

$CH_3CH_2CH_2NH_2$

Amine
1-propylamine

CH_3I

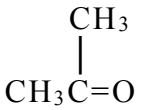
halohydrocarbon
methyl iodide

$CH_2CH_2CH_3$ (OH)

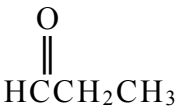
Alcohol
1-propanol

$CH_3OCH_2CH_3$

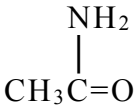
ether
ethyl methyl ether



Ketone
2-propanone

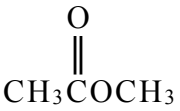


aldehyde
Propanal



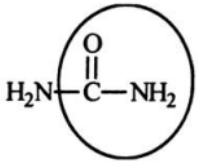
Amide
Ethanamide

nitrile
Propionitrile

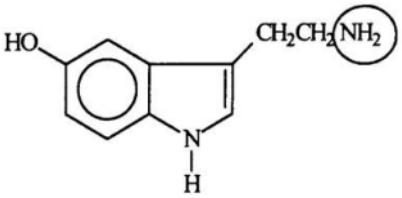


Ester
Methyl ethanoate

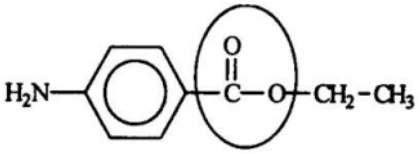
9. Identify the functional group circled in each of the following compounds:
   a. Urea: ***amide***



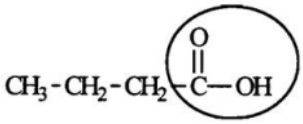
   b. Seratonin (transmits nerve impulses through body) ***amine***



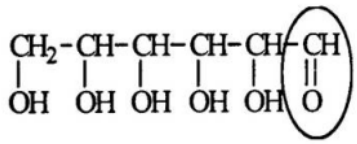
   c. Benzocaine is from a family of chemicals that are good local anesthetics. ***Ester***



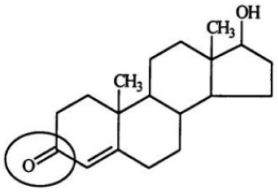
   d. Compound responsible for odor in rancid butter ***carboxylic acid***



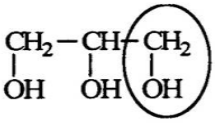
e. Glucose ***aldehyde***



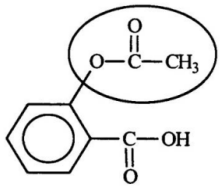
f. Testosterone (male harmone) ***ketone***



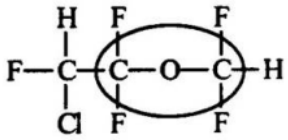
g. Glycerin (used in moisturizers) ***alcohol***



h. Aspirin ***ester***



i. Enflurane is an effective gaseous anesthetic with relatively low flammability. ***ether***



10. ***Name*** the following compounds:

$CH_3CH_2CH_2CH_3$ ***butane***

CH_3OH ***methanol***

CH_3CH_2Cl ***ethyl chloride***

CH_3CH_2OH ***Ethanol / Ethyl alcohol***

$CH_3CH_2CH_2CH_2CH_2C{\equiv}CH$ ***1-heptyne***

$CH_3CH=CHCH_3$ ***2-butene***

$CH_3C\equiv CCH_3$ ***2-butyne***

$(CH_3)_2CHBr$ ***2-bromo propane***

CH_3COOH ***Ethanoic acid (common name: acetic acid)***

CH_3NH_2 ***methyl amine***

Read Chapter 21

Additional Practice Exercises from Chapter 21: 35, 37, 43, 45, 51, 53, 55, 57, 63, 67, 73, 77, 81, 85, 87, 95, 97