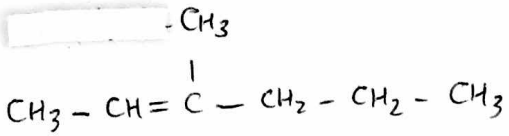
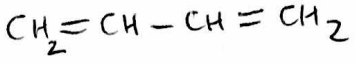
Drawing Hydrocarbons

Draw the following hydrocarbons:

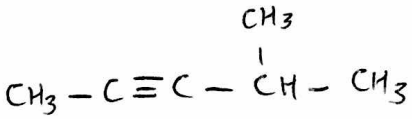
3-methyl-2-hexene



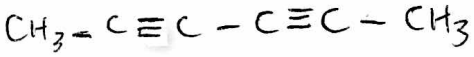
1,3-butadiene



4-methyl-2-pentyne

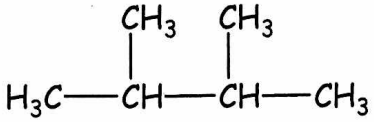


2,4-hexadiyne

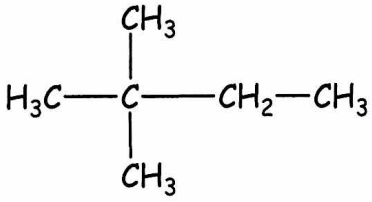


Naming & Drawing Hydrocarbons – Practice Alkanes 1

Name the compounds or draw the structures

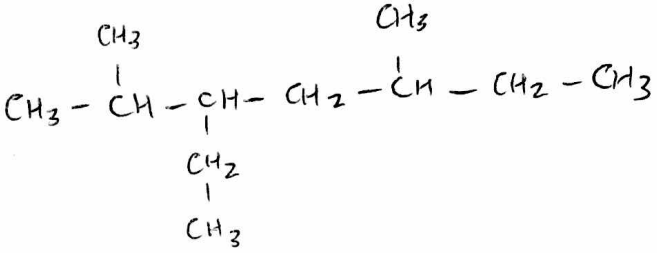


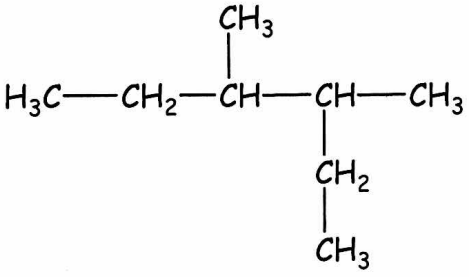
2,3- DIMETHYL BUTANE



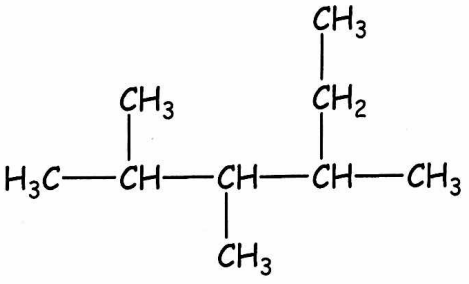
2,2- DIMETHYL BUTANE

3-ethyl-2,5-dimethylheptane

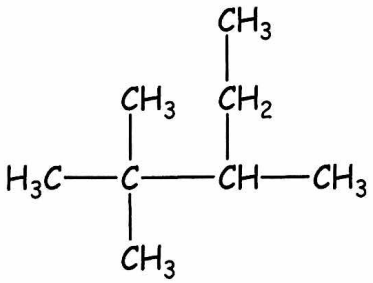




3,4- DIMETHYL HEXANE

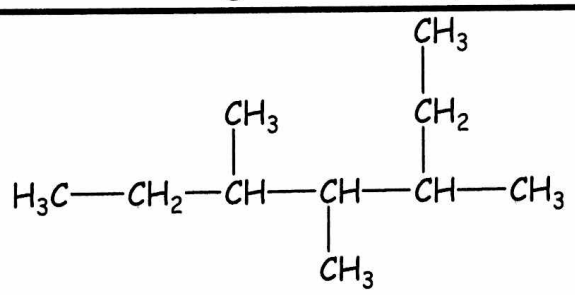


2,3,4 - TRIMETHYL HEXANE

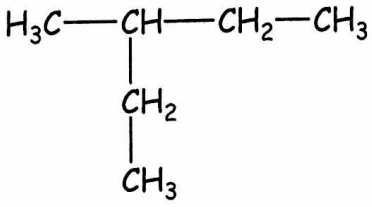


2,2,3 - TRIMETHYL PENTANE

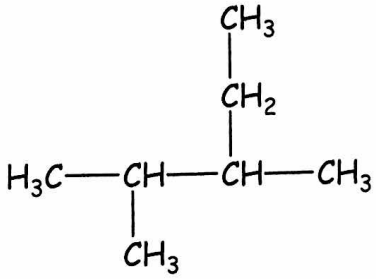
Naming & Drawing Hydrocarbons – Practice Alkanes 2



3, 4, 5 – TRIMETHYL HEPTANE

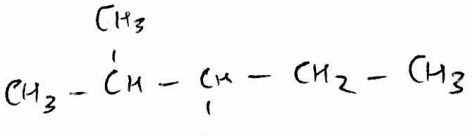


3 – METHYL PENTANE

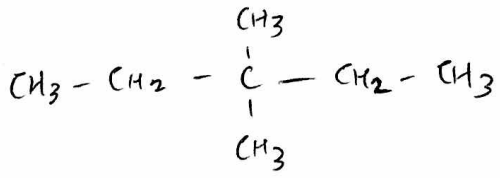


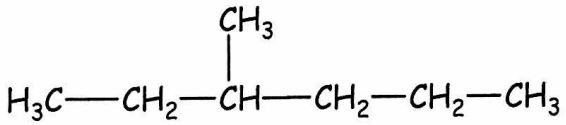
2, 3 – DIMETHYL PENTANE

2,3-dimethylpentane



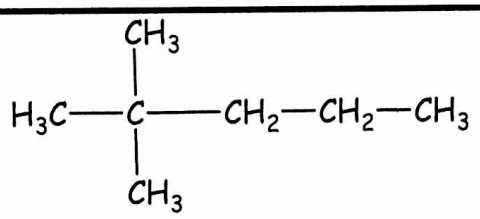
3,3-dimethylpentane





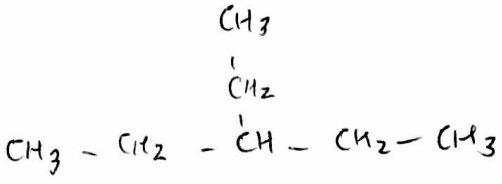
3 – METHYL HEXANE

Naming & Drawing Hydrocarbons – Practice Alkanes 3

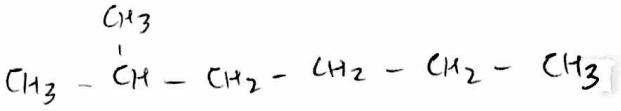


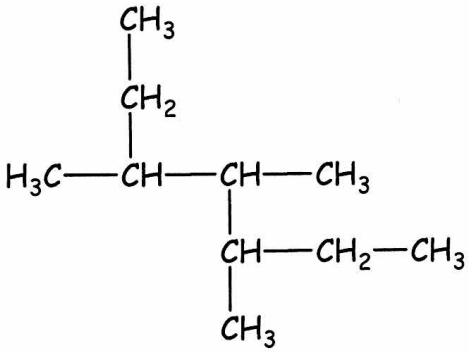
2,2 - DIMETHYL PENTANE

3-ethylpentane

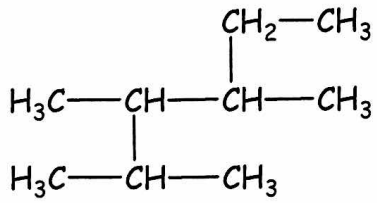


2-methylhexane

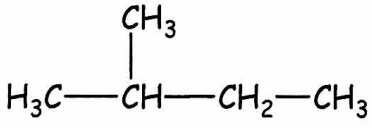




3,4,5 - TRIMETHYL HEPTANE



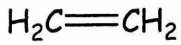
2,3,4 - TRIMETHYL HEXANE



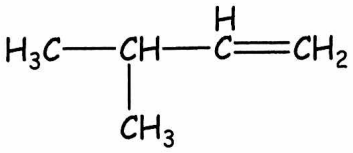
2 - METHYL BUTANE

Naming & Drawing Hydrocarbons – Practice Alkenes

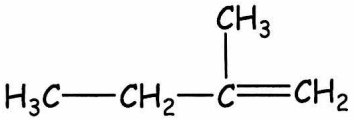
Name the following compounds



ETHENE

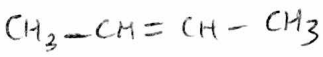


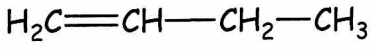
3 - METHYL - 1 - BUTENE



2 - METHYL - 1 - BUTENE

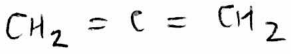
2-butene

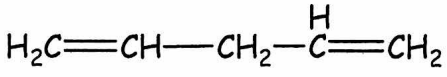




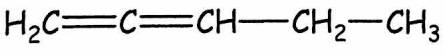
1 - BUTENE

propadiene





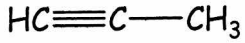
1, 4 - PENTADIENE



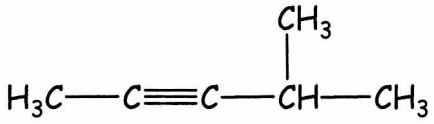
1, 2 - PENTADIENE

Naming & Drawing Hydrocarbons – Practice Alkynes

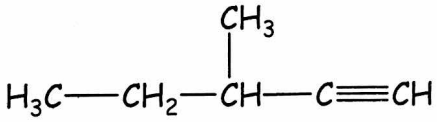
Name or draw the following compounds



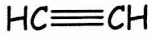
PROPYNE



4 - METHYL - 2 - PENTYNE

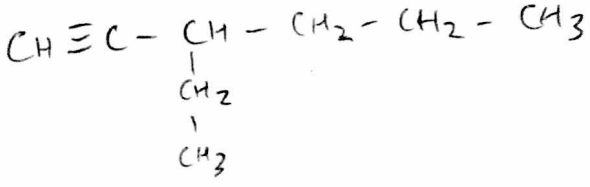


3 - METHYL - 1 - PENTYNE



ETHYNE

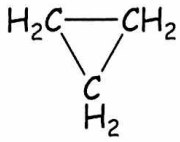
3-ethyl-1-hexyne



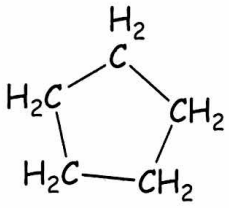
3-heptyne

Naming & Drawing Hydrocarbons – Practice Cycloalkanes

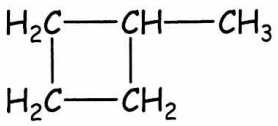
Name or draw the following compounds



CYCLOPROPANE

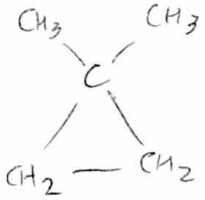


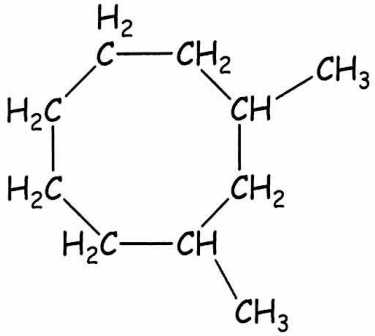
CYCLOPENTANE



1-METHYL BUTANE

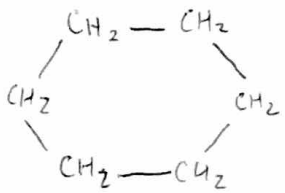
1,1-dimethylcyclopropane





1,3- DIMETHYLCYCLOOCTANE

cyclohexane

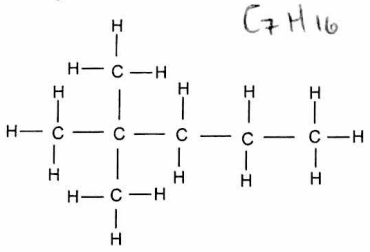


Structural Isomers - Practice

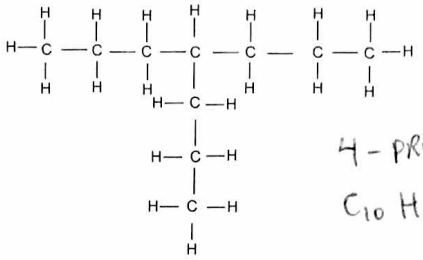
1. Name the following hydrocarbons and give their molecular formulae:

a) 2,2 - DIMETHYL PENTANE

C_7H_{16}



b)



4 - PROPYL HEPTANE

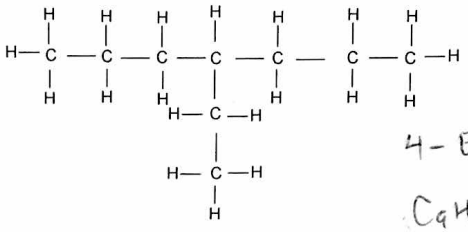
$C_{10}H_{22}$

c) $(CH_3)_3$-C-CH_2-CH_2-CH_2-CH_3

2,2 - DIMETHYL HEXANE

C_8H_{18}

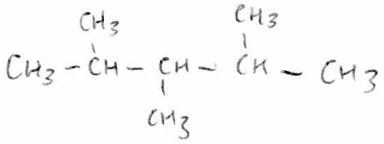
d)



4 - ETHYL HEPTANE

C_9H_{20}

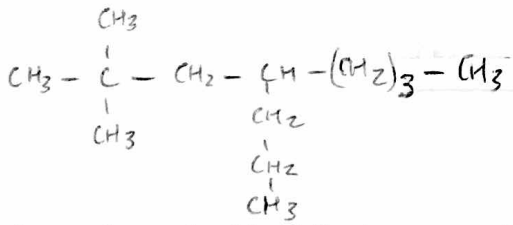
2. Write both structural and molecular formulae for 2,3,4-trimethylpentane.



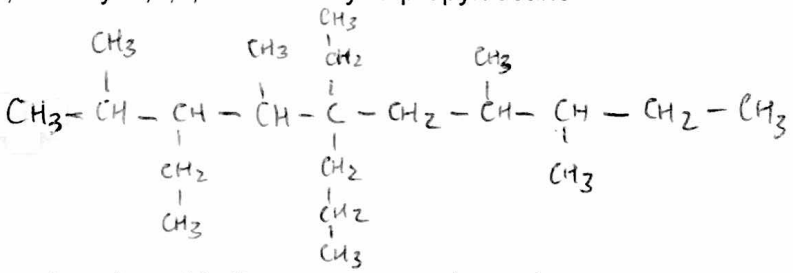
C_8H_{18}

3. Draw:

a) 2,2-dimethyl-4-propyloctane



b) 3,5-diethyl-2,4,7,8-tetramethyl-5-propyldecane



4. State why each of the following names is incorrect, and provide the proper name for each. (Hint – draw them first)

a) 3-propylhexane

PARENT: HEPTANE

b) 4-methylpentane

2 - METHYL-PENTANE

c) 4-ethyl-2-methylpentane

PARENT: HEXANE

ALSO LOWEST # IN ALPHABETICAL (SYMMETRICAL)

d) 1,3-dimethylpropane

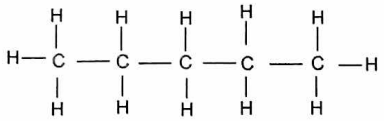
PENTANE

5. The molecule 3-ethylhexane is a structural isomer of which straight-chain alkane?

OCTANE

6. Which of the following represent the same molecule? Why?

a)



b) CH_3-CH_2-CH_2-CH_3 c) C_5H_{12} d) CH_3-CH_2-CH_2-CH_2-CH_3

a & d → CONFORMATIONAL ISOMERS (SAME MOLECULE)

MAYBE c → DEPENDS ON STRUCTURE

7. Draw one structural isomer for each of the following compounds:

a) $CH_3C(CH_3)_2CH_3$ b) $CH_3CH(CH_3)CH(CH_3)CH_3$

$CH_3 - CH_2 - CH_2 - CH_2 - CH_3$

$CH_3 - CH_2 - CH_2 - CH(CH_3) - CH_2 - CH_3$

ANSWERS CAN VARY

8. Would it be more important to store octane or pentane in a tightly sealed bottle at low temperature? Why?

PENTANE

- IT HAS LOWER MASS & IS NON-POLAR (LDF)

$\frac{1}{2}mv^2$ ∴ ↑ $\vec{v}$ FOR PENTANE AND THUS

A ↓ f.p. & m.p.

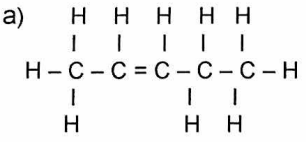
9. The gasoline blend sold in hot climates consists of hydrocarbons of larger molecular mass than the gasoline sold in cold climates. Why might refiners vary the blends in this way?

TO MAINTAIN THE RIGHT VOLATILITY

(SEE REASONING IN # 8)

Practice: Alkenes and Alkynes

1 Name the following hydrocarbons:

a) 

2- PENTENE

b) $CH_3CHCH_2CH_3$ (with CH_2CH_3 branch)

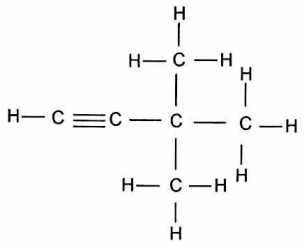
3 - METHYLPENTANE

c) $CH_3CH_2CH_2CHCHCH_3$

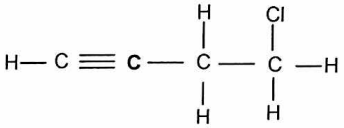
2 - HEXENE

d) CH_3-CH=C(CH_3)-CH_3

2-METHYL- 2-BUTENE

e) 

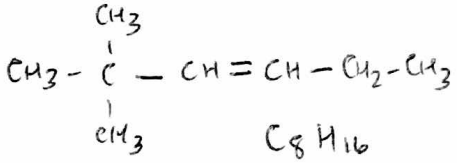
3,3 - DIMETHYL-1- BUTYNE

f) 

4- CHLORO - 1- BUTYNE

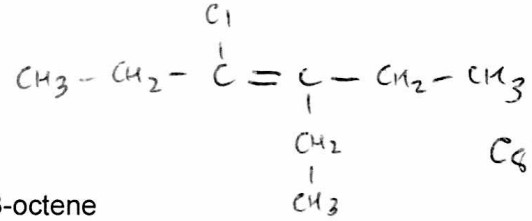
2. Write both structural and molecular formulae for the following (If a compund has geometric isomers put check next to the name).

a) 2,2-dimethyl-3-hexene



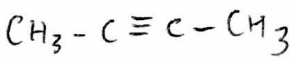
C_8H_{16}

b) 3-chloro-4-ethyl-3-hexene



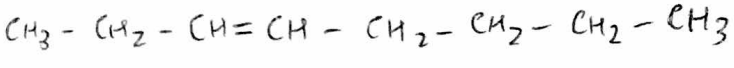
$C_8H_{15}Cl$

c) 2-butyne



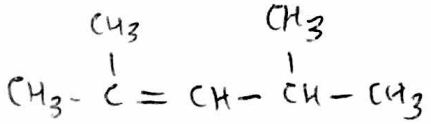
C_4H_6

d) 3-octene



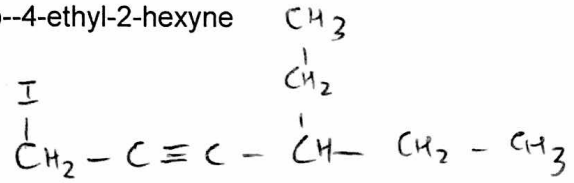
C_8H_{16}

e) 2,4-dimethyl-2-pentene



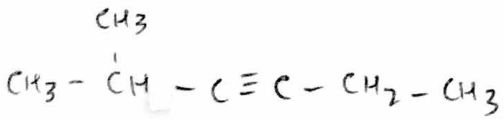
C_7H_{14}

f) 1-iodo--4-ethyl-2-hexyne



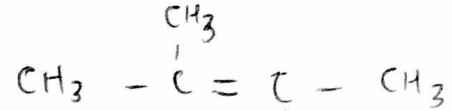
$C_8H_{13}I$

g) 2-methyl-3-hexyne



C_7H_{12}

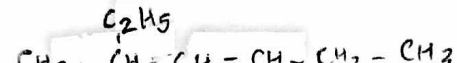
h) 2,3-dimethyl-2-butene



C_6H_{12}

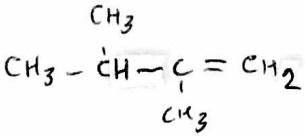
3. State why each of the following names is incorrect, and provide the proper name for each.

a) 2-ethyl-3-hexene



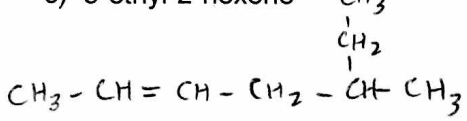
5-METHYL-3-HEPTENE

b) 2,3-dimethyl-3-butene



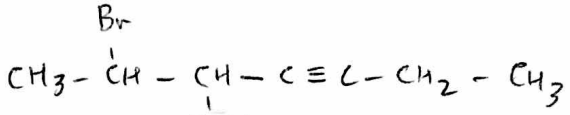
2,3-DIMETHYL-1-BUTENE

c) 5-ethyl-2-hexene



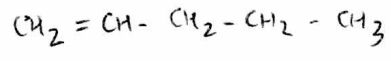
5-METHYL-2-HEPTENE

d) 3-ethyl-2-bromo-4-heptyne

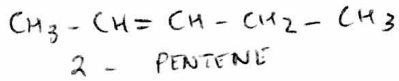


4-ETHYL-5-BROMO-3-HEPTYNE

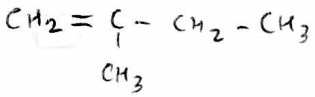
4. Draw a structural formula for each alkene with the molecular formula C_5H_{10}. Name each of these compounds.



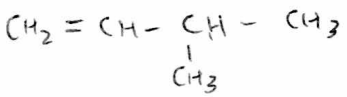
1-PENTENE



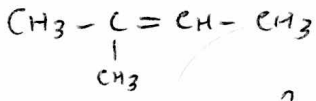
2-PENTENE



2-METHYL-1-BUTENE

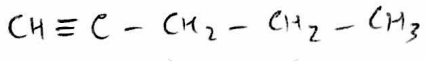


3-METHYL-1-BUTENE



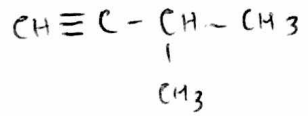
2-METHYL-2-BUTENE

5. Draw a structural formula for each alkyne with the molecular formula C_5H_8. Name each.



1-PENTYNE

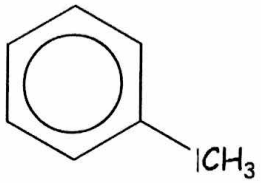
2-PENTYNE



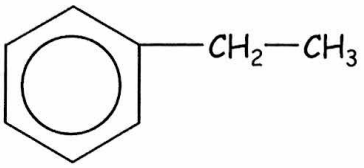
3-METHYL-1-BUTYNE

Naming & Drawing – Practice Aromatic Hydrocarbons

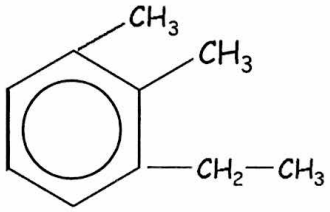
Name or draw the following compounds



METHYL BENZENE

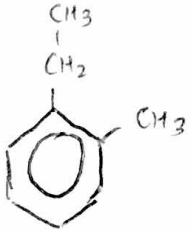


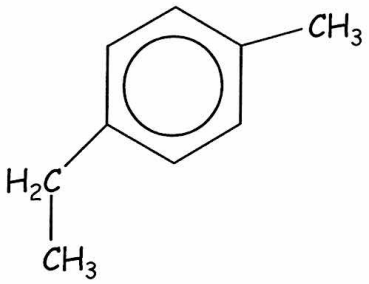
ETHYL BENZENE



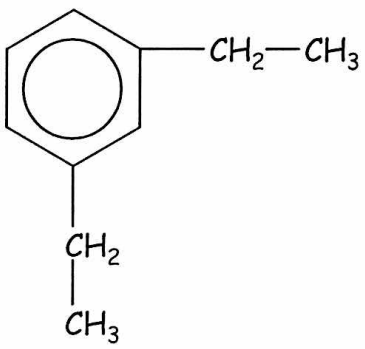
1-ETHYL-2,3-DIMETHYL BENZENE

1-ethyl-2-methylbenzene





PARA - ETHYL METHYL BENZENE

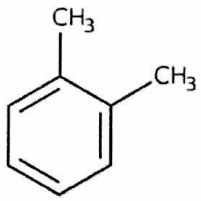


META - DIETHYL BENZENE

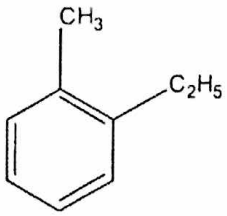
Naming of Benzene and Related Compounds

A) **Ortho**:

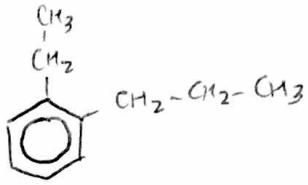
1,2-dimethylbenzene OR
orthomethylbenzene OR
o-methylbenzene



1,2-ethylmethylbenzene OR
o-ethylmethylbenzene

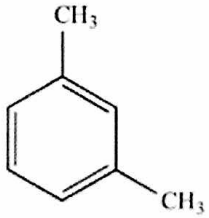


Try:
o-ethylpropylbenzene

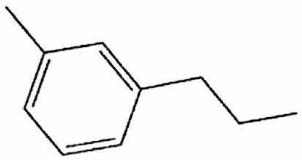


B) **Meta**:

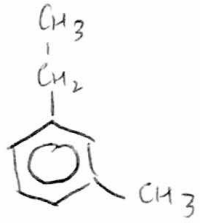
1,3-dimethylbenzene OR
metamethylbenzene OR
m-methylbenzene



m-methylpropylbenzene



Try:
m-ethylmethylbenzene

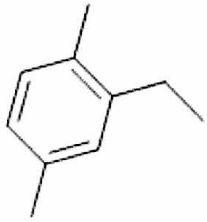


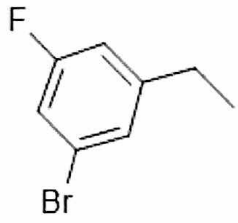
C) **Para**:

1,4-dimethylbenzene OR
paramethylbenzene OR
p-methylbenzene

Try:
p-ethylbenzene

Polysubstituted





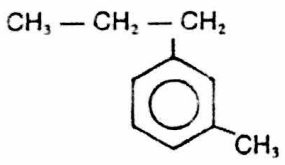
2-ETHYL-1,4-DIMETHYLBENZENE

1-BROMO-3-ETHYL-5-FLUORO BENZENE

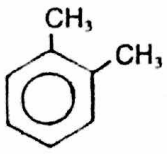
Naming Benzene Compounds

Name the following aromatic hydrocarbons:

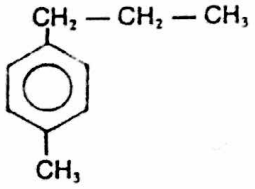
1. m – METHYLPROPYL BENZENE



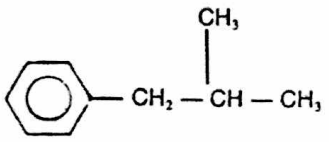
2. o – DIMETHYL BENZENE



3. p – METHYLPROPYL BENZENE

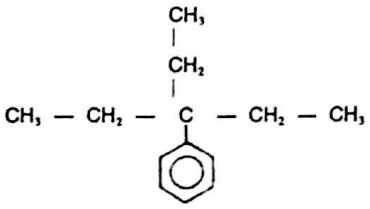


4.

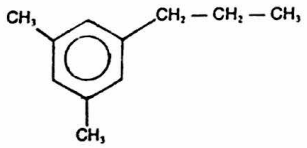


2 - METHYL - 1-PHENYLPROPANE

5. 3-ETHYL-3-PHENYLPENTANE

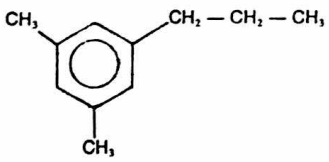


6.



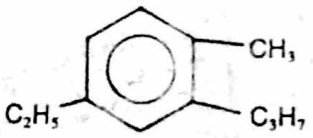
1-ETHYL-3,5-DIMETHYL BENZENE

7.

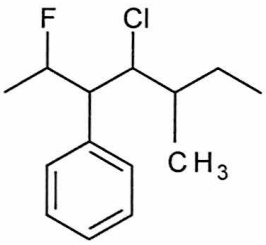


1,3-DIMETHYL-5-PROPYL BENZENE

8. 4-ETHYL-1-METHYL-2 PROPYLBENZENE



9.

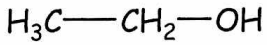


4-CHLORO-2-FLUORO-5-METHYL-3-PHENYLHEPTANE

Naming & Drawing Hydrocarbons – Practice Alcohols

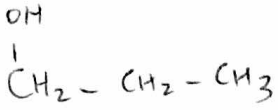
Name or draw the following compounds

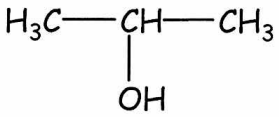
METHANOL



ETHANOL

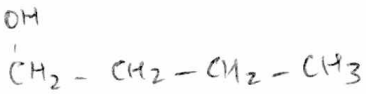
1-propanol

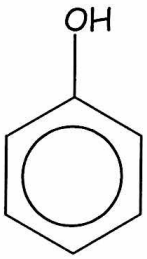




2 - PROPANOL

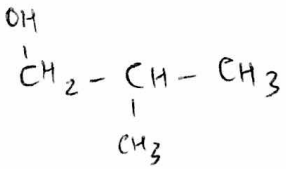
1-butanol



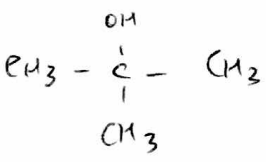


BENZENOL

2-methyl-1-propanol



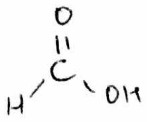
2-methyl-2-propanol



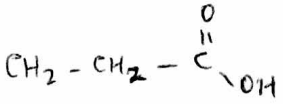
Naming & Drawing Hydrocarbons – Practice Organic Acids

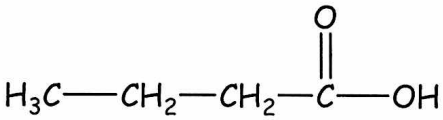
Name or draw the following compounds

methanoic acid

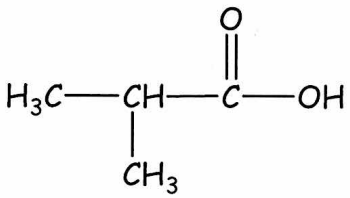


propanoic acid

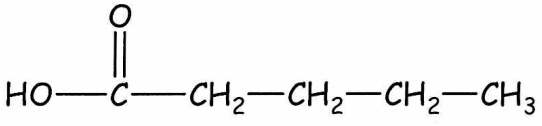




BUTANOIC ACID

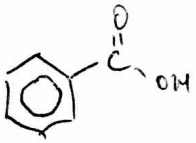


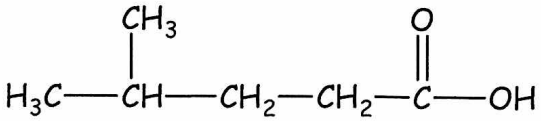
2-METHYL-1-PROPANOIC ACID



PENTANOIC ACID

benzoic acid

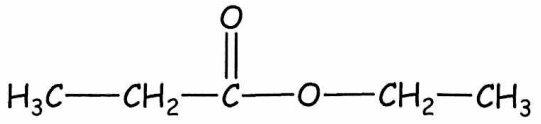




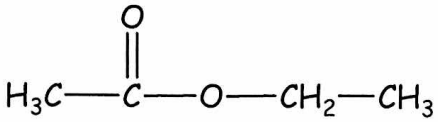
4-METHYL PENTANOIC ACID

Naming & Drawing Hydrocarbons – Practice Esters

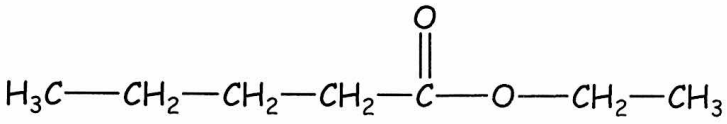
Name or draw the following compounds



ETHYL PROPANOATE

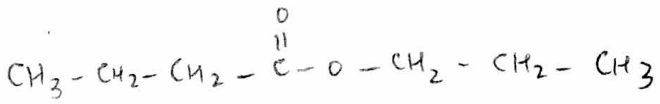


ETHYL ETHANOATE

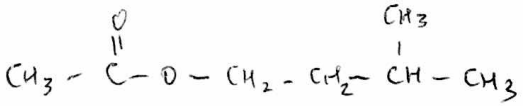


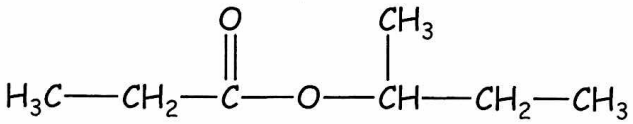
ETHYL PENTANOATE

propyl butanoate



3-methylbutyl ethanoate





1-METHYLPROPYL PROPANOATE