Families of Hydrocarbons

Recap

Hydrocarbons are chemical compounds that contain the elements Hydrogen and Carbon only. Crude Oil is made up of a molecule of different hydrocarbons. We can separate them into different fractions using fractional distillation.

Hydrocarbons follow the same rules so the alkene family all end in "ane

so the alkene family all ends in "ane"

Alkane

methane
ethane
propane
butane
pentane

Alkene

ethene
propene
butene
pentene
hexene

Naming hydrocarbon families

2

Prefix	Number of carbons
Meth	1
Eth	2
prop	3
But	4

pent	5
hex	6
hept	7
Oct	8

If it had 3 carbons, the prefix for 3 is prop

If it is an alkene then its ending is ene

So our alkene with 3 carbons is propene

1. Pentene
2. Butene
3. Ethene
4. methene
5. ptene

5. Octane
6. 4
7. 4
8. Heptane

1. 2
2. 1
3. yes for every 1 carbon there is 4 hydrogen

C_1H_4

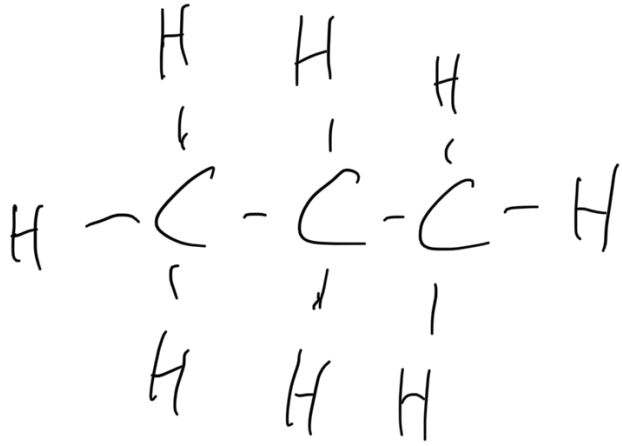
1. $C_{16}H_{20}$
2. $C_{27}H_{31}$
3. $C_{40}H_{44}$

1. $C_{30}H_{34}$

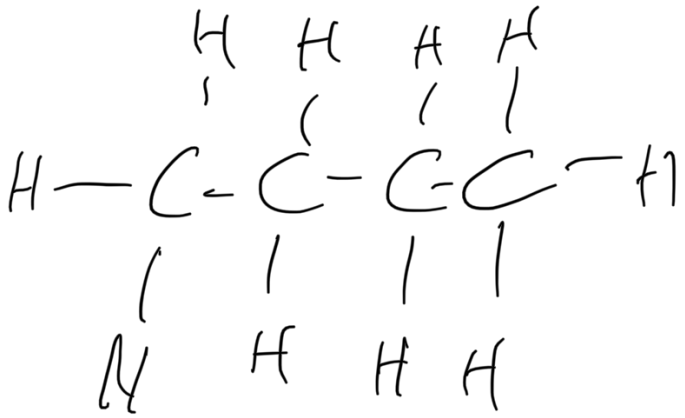
Propene — Family

How many Carbons? 3

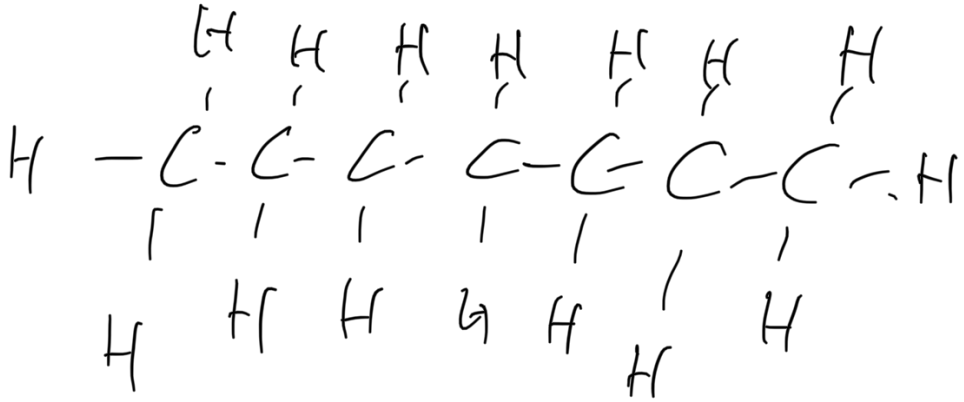
Are Alkene



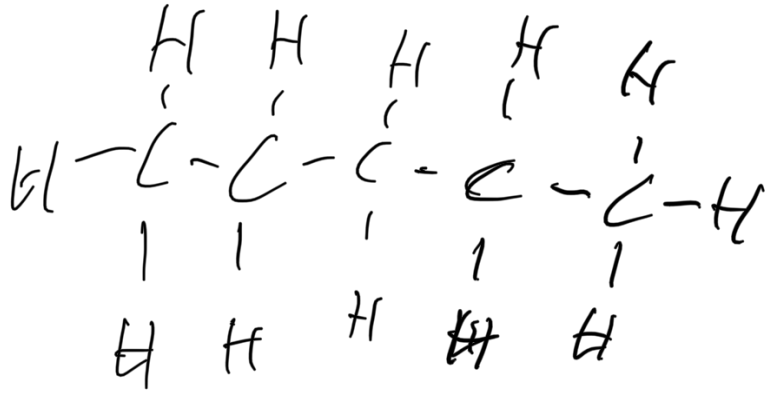
Butane



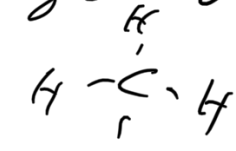
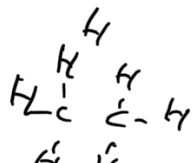
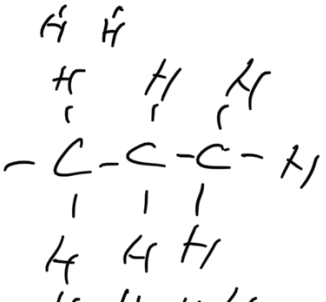
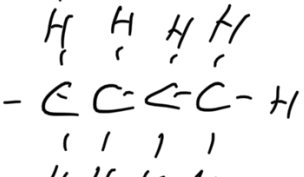
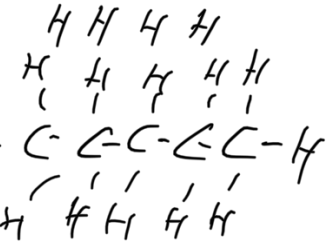
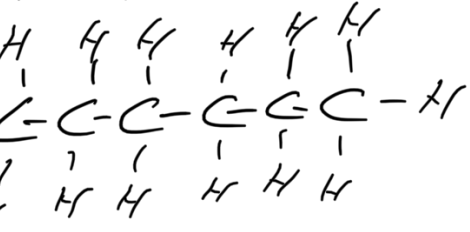
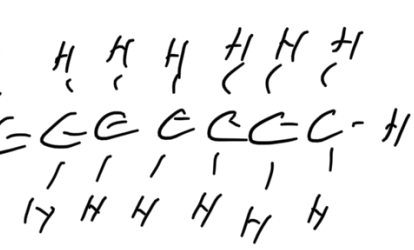
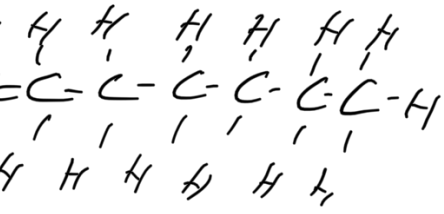
a)



b)



Name | number of carbons | molecular formula | structural

Methene	1	CH_4	
ethene	2	C_2H_6	
Propene	3	C_3H_8	
Butene	4	C_4H_{10}	
propene	5	C_5H_{12}	
Hexene	6	C_6H_{14}	
Heptene	7	C_7H_{16}	
Octene	8	C_8H_{18}	

Alkene Series

general formula

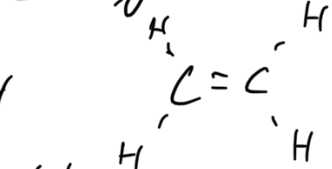
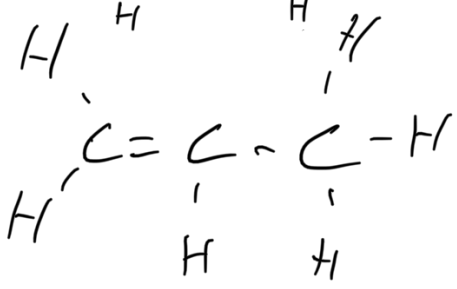
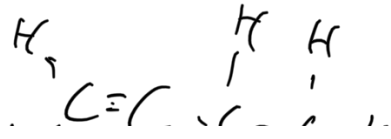
this is used to link molecules of the same hydrocarbon family, same known how many hydrogens and carbons they have.

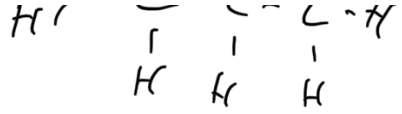
C_2H_4 C_3H_6 C_5H_{10}

The general formula for an Alkene is

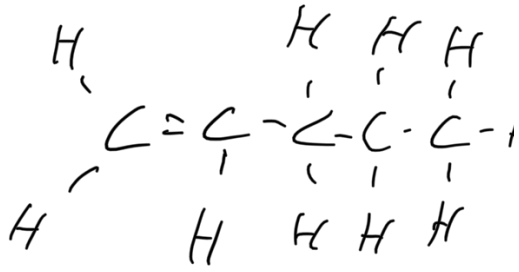
C_1H_2

1. C_6H_{12}
2. $C_{20}H_{40}$
3. $C_{12}H_{24}$
4. $C_{100}H_{200}$

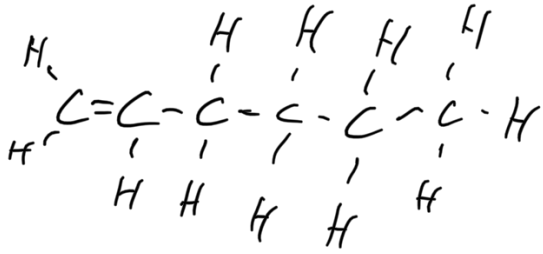
Name	Number of Hydrocarbons	Molecular Formula	Structural formula
Ethene	2	C_2H_4	
propene	3	C_3H_6	
Butene	4	C_4H_8	



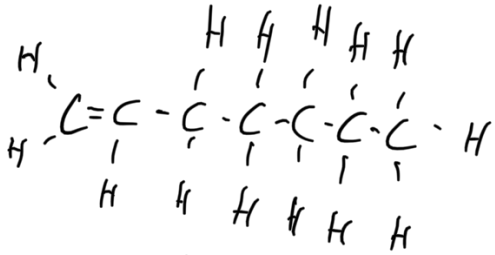
Pentene 5 C_5H_{10}



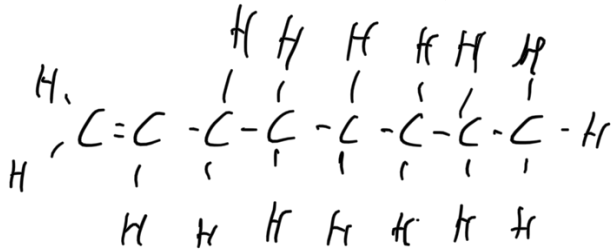
Hexene 6 C_6H_{12}



Heptene 7 C_7H_{16}

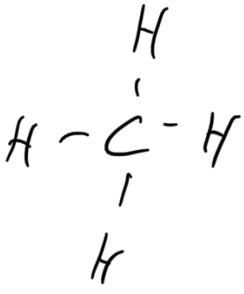


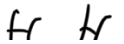
Octene 8 C_8H_{18}



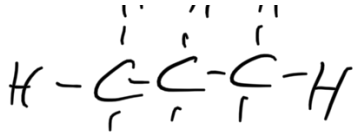
Quick quiz

1. Methane CH_4

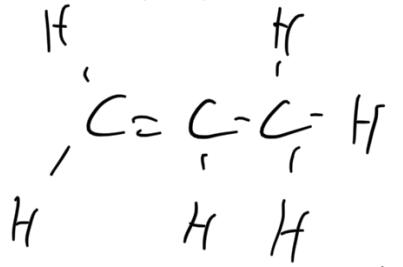




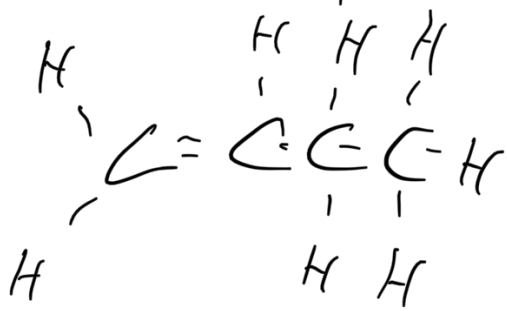
Propane C_3H_8



Propene C_3H_6



Butene C_4H_8



2. b) $(2 \times 6) + 2$

c) $(2 \times 8) + 2$

d) $(2 \times 5) + 2$

e) $(2 \times 100) + 2$

a) $(2 \times 4) + 2$

Saturated

A saturated hydrocarbon has no space for more atoms

Alkanes are saturated as there are no double bonds

Unsaturated

An unsaturated hydrocarbon has less hydrogens, so more spaces for others atoms.

Alkenes are unsaturated as they contain a double bond

We can use Bromine water test for unsaturation

hydrocarbon	Color of Bromine water at start	Color at end	Effect on bromine water
Alkenes	Brown	clear	change of color
Alkenes	Brown	Brown	none

Saturated/unsaturated
unsaturated
Saturated

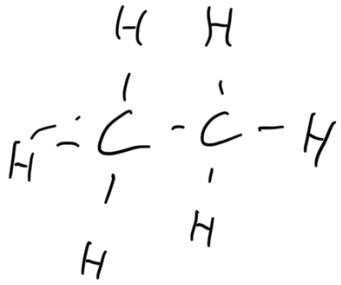
Exam Question

A saturated hydrocarbon has no space for any other hydrogen atoms. However an unsaturated hydrocarbon can break its double bond to allow another 2 hydrogen atoms to join it.

recap

Alkanes
general formula: C_1H_4

Propene

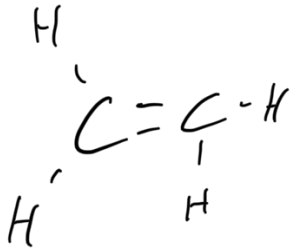


It is saturated

Alkenes

general formula: C_nH_{n+2}

Propene



It is unsaturated

Hydrocarbons
Part 2

1. a) 2
b) ?
c) 1
d 4

2. C_1H_4

3.

Name of hydrocarbon	Molecular formula
Hexene	C_6H_{14}
Pentene	C_5H_{10}
Ethene	C_2H_6
Propene	C_3H_5

4. Butene

5. propene

6. unsaturated means the hydrocarbons and a 2 hydrogen atoms can join it.

7. We use a Bromine water

solution to test for concentration
we know its positive by
it changing from brown to blue

8. a) C
   b) A

9. C_3H_6

10. a) D
    b) C/E
    c)