

3 August 2018

Friday.

## Chapter: 11

## "Organic Chemistry"

### Review Questions.

Q. 2010 What is the difference between alkane and alkyl radical?

The difference between alkane and alkyl radical is as follows:

#### Alkane

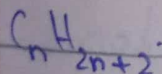
The types of saturated hydrocarbon which contain carbon-carbon single bond, is called alkane.

#### Alkyl Radical

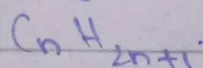
Group of atoms that is obtained by removing one hydrogen from an alkane, is called Alkyl radical.

### General Formula

General formula for alkane is



General formula for alkyl radical is



### Stability

Alkane are stable compound.

Alkyl radical is less stable as it's tendency is to accept another atom.

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## Reactivity

As they are stable they are less stable reactive.

As they are less stable, they are more reactive.

## Representation

In alkane stem, represents number of carbon atoms and "ane" is used as suffix in Alkane.

Alkyl radicals are generally represented by R.

## Examples

Methane

Methyl

Butane

Butyl

Hexane etc.

Hexyl etc.

Q: What is the difference between saturated and un-saturated hydrocarbon.

Saturated  
Hydro-carbon

Unsaturated  
Hydro-carbon

## Definition

Hydrocarbon having carbon-carbon single bond are called saturated hydrocarbon.

Hydrocarbons having carbon-carbon multiple bonds are called unsaturated hydrocarbons.

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## Bonds

All bonds are sigma bonds.

In double bonds there is one sigma and one pi bond ( $\pi$ ) while triple bonds there is one sigma and two pi bonds.

## Compounds

It contains alkanes. It contains alkenes and alkynes.

## General Formula

General formula for saturated hydrocarbons is  $C_nH_{2n+2}$ .

General formula for alkenes is  $C_nH_{2n}$  and for alkynes is  $C_nH_{2n-2}$ .

## General names

Alkanes are generally referred as Paraffins.

Alkenes are generally referred as <sup>olefins</sup> olefins and alkynes are known as acetylenes.

## Types of Reaction

Saturated hydrocarbon usually gives substitution reaction.

Unsaturated hydrocarbon usually gives addition reactions.

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## Reactivity

They are more stable and less reactive due to sigma bonds

They are less stable and more reactive due to pi bond.

## Example

Methane

Ethane

Propane

Methene

Ethene

Propene

Q: Write the difference between Ethene and Ethane.

Ethane

Ethene

## Compounds

Ethane is saturated hydrocarbon

Ethene is unsaturated hydrocarbon.

## Bonds

They have sigma bond.

It has double bond, one sigma bond and one pi bond.

## General Formula

$C_2H_6$  is the general formula of Ethane.

$C_2H_4$  is the general formula of Ethene.

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## Group

It belongs to alkane.

It belongs to alkenes.

## Type of Reaction

It give substitution reaction.

It gives additional reaction.

## Reactivity

It is more stable and less reactive.

It is less stable and more reactive.

SOCHBADLOBYMA

## Chapter: 11

# "Organic Chemistry"

## Review Exercise

Q2: Write short answers:

(i) What catenation?

### Catenation:

"The self-linking ability of carbon is called catenation."

Example - ?

(ii) Define isomerism.

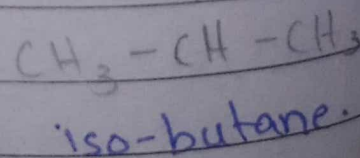
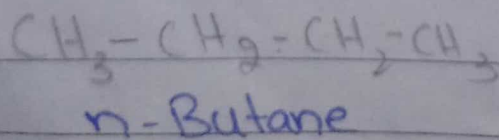
### Isomerism:

"The compounds that have same molecular formula but different arrangement of atoms in their molecules are called isomers. This phenomenon is called isomerism."

Also write example of pentane

### Example:

For example two compounds have molecular formula  $C_4H_{10}$



(iii) Give three examples of alkyl groups.

### Definition:

"An alkyl radical is a group of atoms obtained by removing one hydrogen from an alkane."

### Example:

Methane  
 $\text{CH}_4$

Methyl  
 $\text{CH}_3-$

Ethane  
 $\text{C}_2\text{H}_6$

Ethyl  
 $\text{CH}_3\text{CH}_2-$

Propane  
 $\text{CH}_3\text{CH}_2\text{CH}_3$

Propyl  
 $\text{CH}_3\text{CH}_2\text{CH}_2-$

(iv) Define a functional group.

### Functional Group:

"An atom or groups of atoms that give a family of organic compounds its characteristic chemical and physical properties is called a functional group."

Examples - ?

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## Chapter: 11 "Organic Chemistry"

### Review Exercise:

8. What is the name of alkyl group obtained by removing an end hydrogen from (i) propane (ii) ethane?

(i) Propane:

Alkane:

Propane

Alkyl Group:

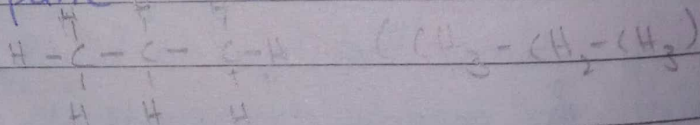
Definition:

"An alkyl radical is a group of atoms obtained by removing one hydrogen atom from an alkane."

(i) Propane:

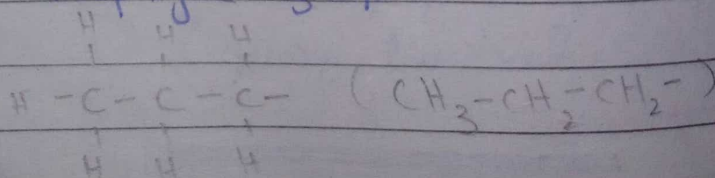
Alkane:

Propane ( $C_3H_8$ )



Alkyl Radical:

Propyl ( $C_3H_7$ )



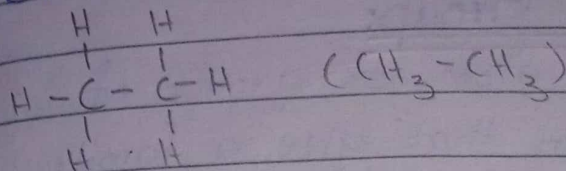
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(ii) Ethane:

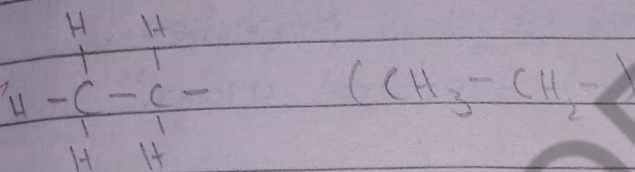
Alkane:

Ethane ( $C_2H_6$ )



Alkyl Radical:

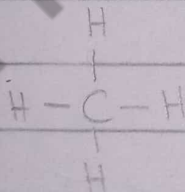
Ethyl ( $C_2H_5$ )



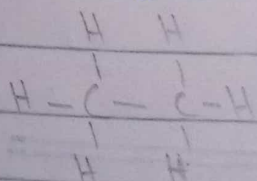
9. Give the structural formula of two simple alkanes and one alkyne.

Alkanes:

(i) Methane ( $CH_4$ )

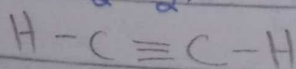


(ii) Ethane ( $C_2H_6$ )



Alkyne:

(i) Ethyne ( $C_2H_2$ )



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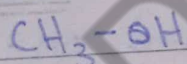
10. What is meant by the term functional group?

### Functional Group:

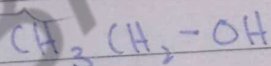
"An atom or groups of atom that give a family of organic compounds its characteristic chemical and physical properties is called functional group."

### Example:

#### Alcohol:

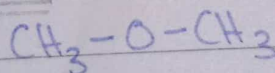


methanol (methyl alcohol)

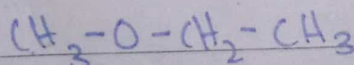


ethanol (ethyl alcohol).

#### Ethers:



(dimethyl ether)



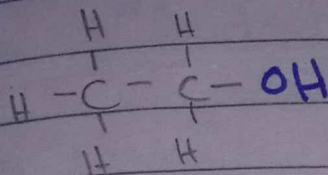
(Ethyl methyl ether)

16. For each of the following, sketch the structural formula of a two-carbon compound containing the indicated functional group.

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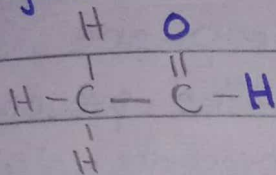
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(a) alcohol



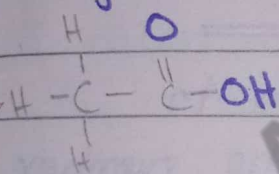
(ethanol)

(b) aldehyde



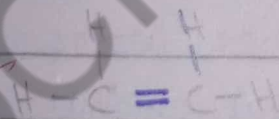
(ethanal)

(c) carboxylic acid



(ethanoic acid)

(d) alkene

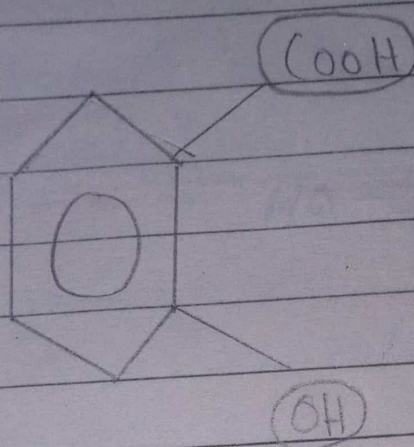


(ethene)

7. Aspirin is a mild pain killer and fever reducer. It is manufactured from salicylic acid. Select functional groups present in it and encircle them. Justify your selection.

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✓ It has functional group one is alcoholic group (OH) as the presence of hydroxyl group represents alcohols and other is carboxylic acid group (COOH) and its presence show carboxylic acid.

20. Bonding of carbon atom to heteroatoms increases the number of organic compounds. Justify it.

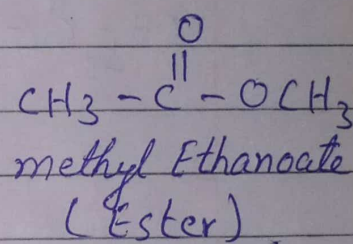
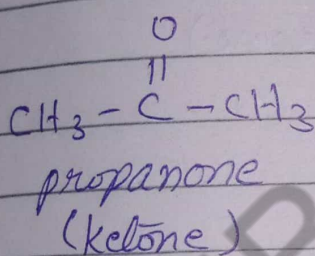
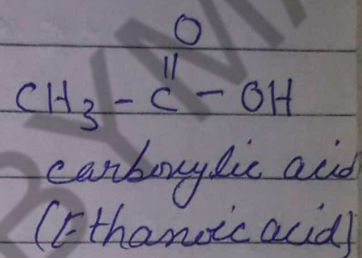
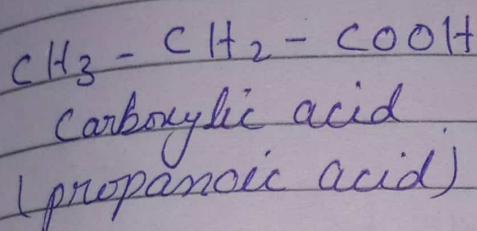
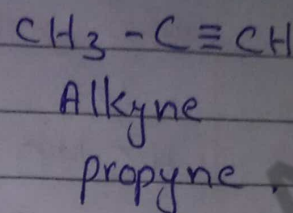
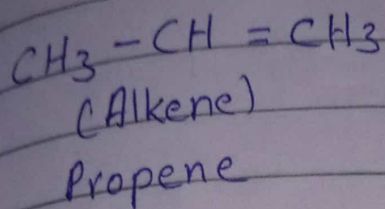
Carbon can form single stable and multiple bonds with other atoms like oxygen, nitrogen and sulphur.

✓ For these reasons, carbon forms almost infinite number of molecules of various sizes, shapes and structures.

Neat work

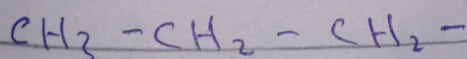
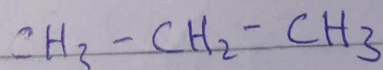
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Q6) Identify the following compounds on the basis of functional groups.

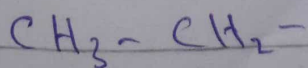
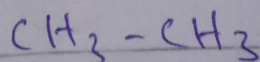


Q8) What is the name of alkyl group obtained by removing an end hydrogen atom from

i) Propane

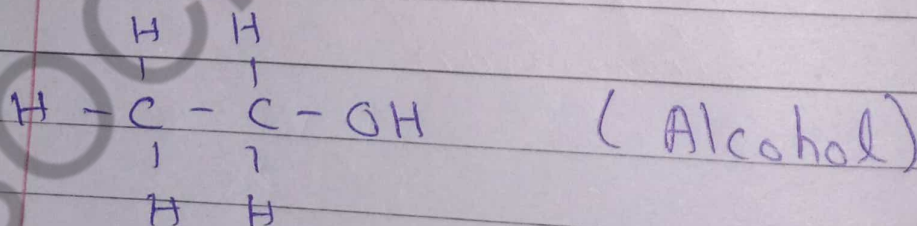
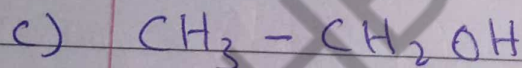
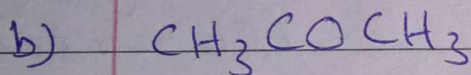
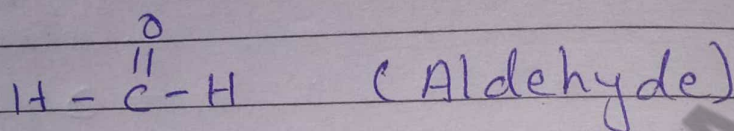
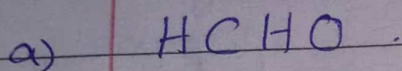


ii) Ethane



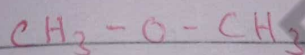
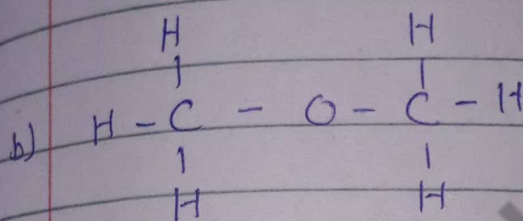
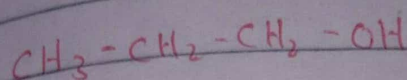
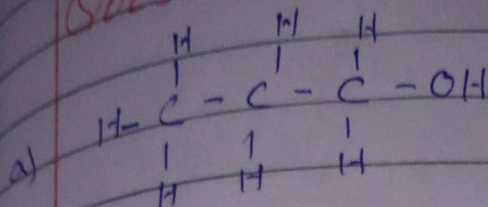
## QUESTION 11

Identify the type of following compounds as an alcohol, aldehyde or ketone.

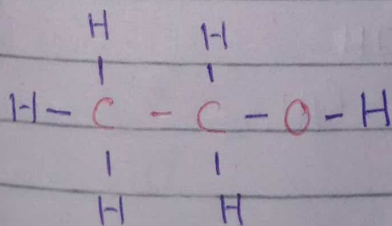
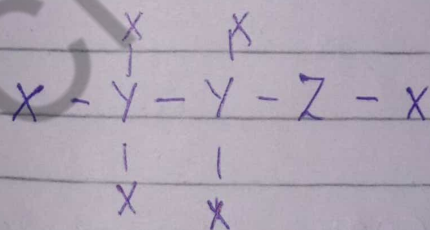


THINK TANK

QUESTION 13.

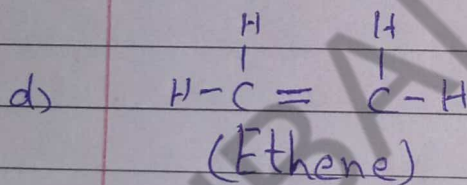
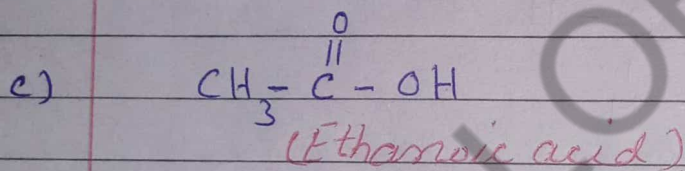
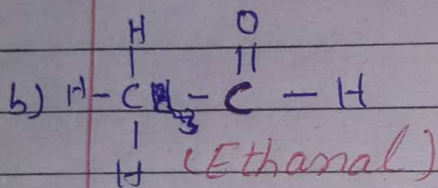
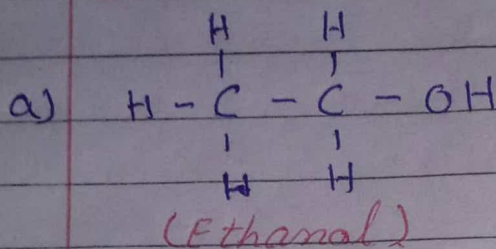


QUESTION 14



(c) Ethanol.

### QUESTION 16



### QUESTION 17

