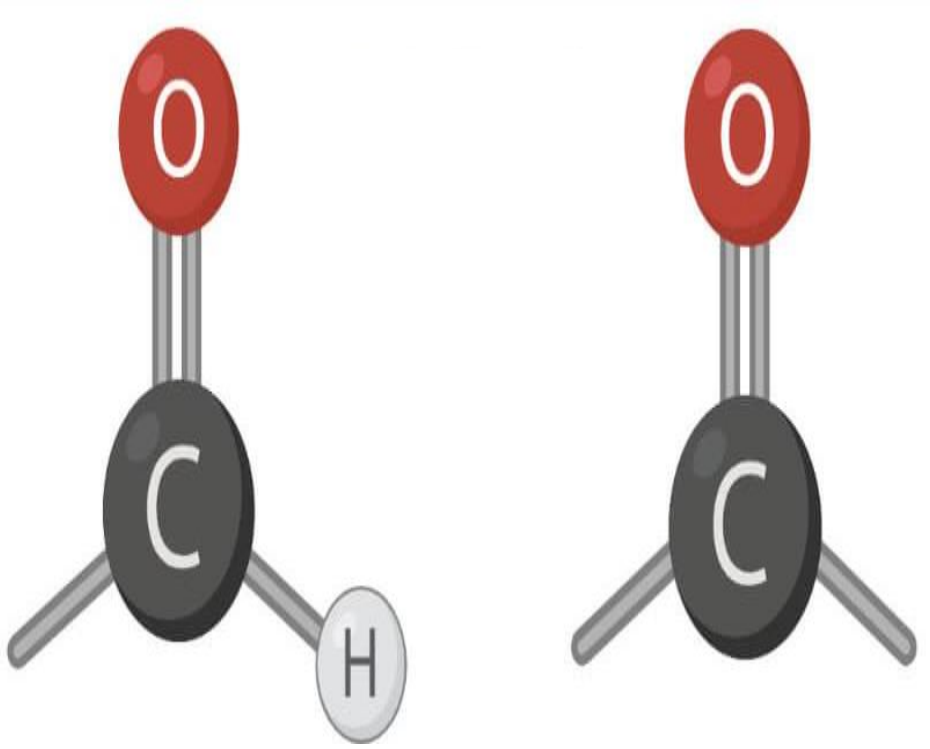
Chapter 10

Aldehydes & ketones



Aldehydes

Hussein Semaan

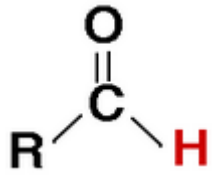
1- Molecular formula:

$C_nH_{2n}O$ with $n \geq 1$

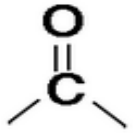
2- Molar mass:

14n + 16

3- Strutural formula:



4- Functional group:

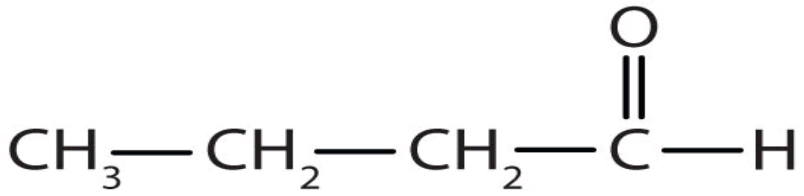


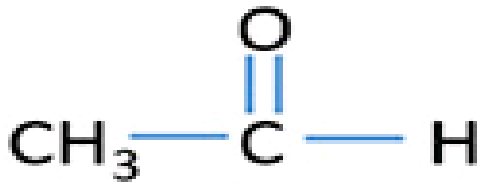
carbonyl group

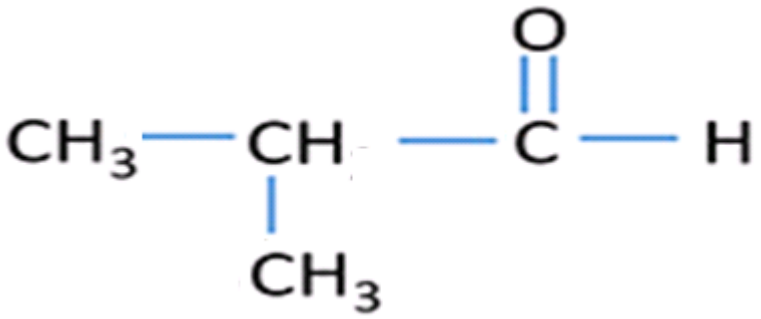
5- Nomenclature :

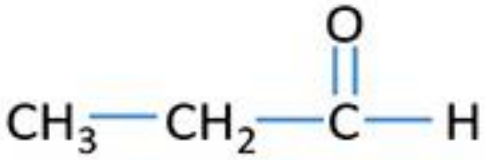
Alkane ⟹ AlKanal

The position of functional group should not be indicated in the nomenclature since it is found on the carbon number one





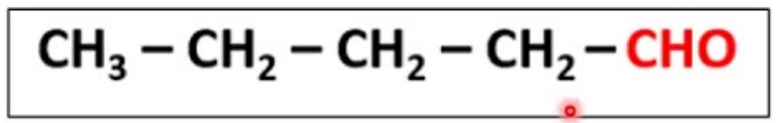


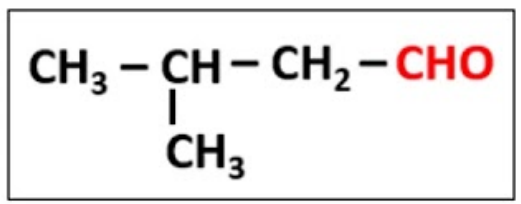


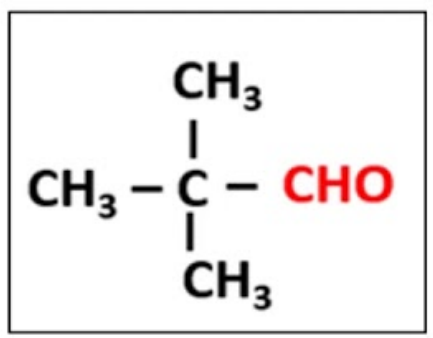
6- isomers of aldehydes:

Aldehydes have skeletal isomer and a functional Isomer which is ketone

Write all possible condensed structural formula of an aldehyde of fromula C_4H_8O







ketones

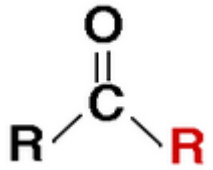
1- Molecular formula:

$C_nH_{2n}O$ with $n \geq 3$

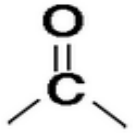
2- Molar mass:

14n + 16

3- Structural formula:



4- Functional group:

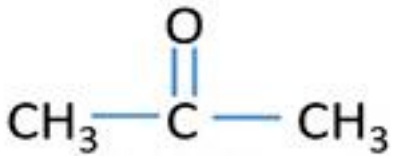


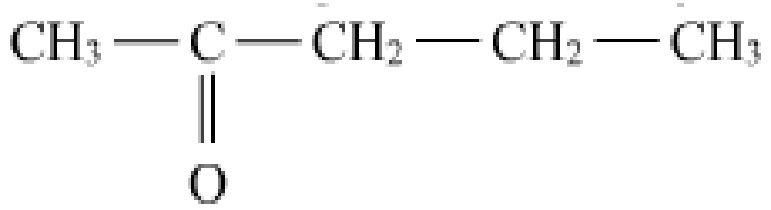
carbonyl group

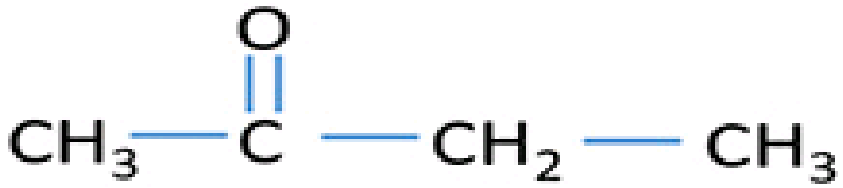
5- Nomenclature :

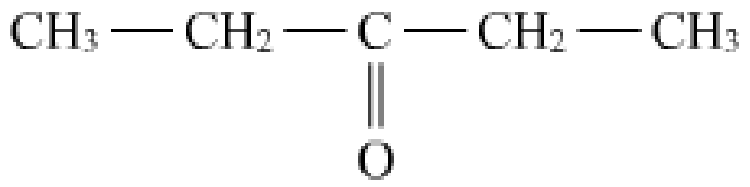
Alkane → Alkanone

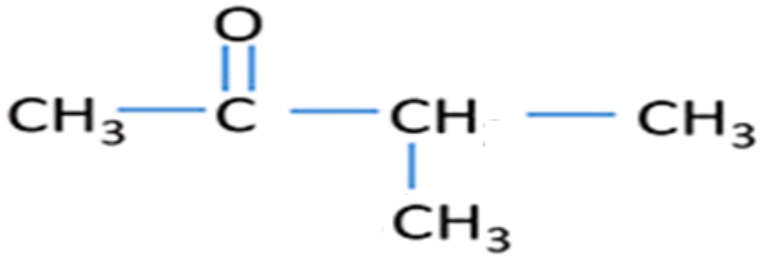
The position of the fucntional group should be indicated if the main chain contains at least 5 carbon atoms : x-alkanone







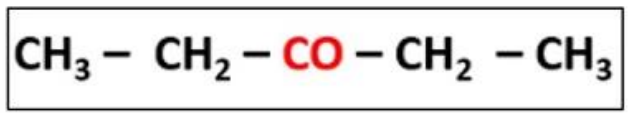


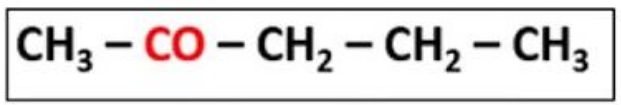


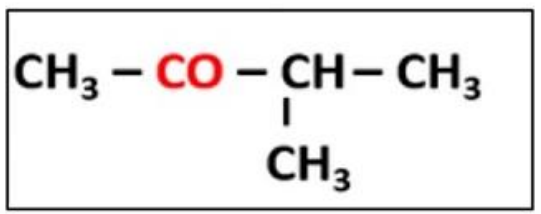
6- isomers of ketones:

Ketones have skeletal and positionl isomers and a functional isomer which is aldehyde

Write all possible condensed structural formula of a ketone of molecular formula $C_5H_{10}O$







Identify experimentaly aldehydes and ketones:

	2,4-DNPH	$NaHSO_3$	fehling (blue)	schiff's reagant (colorless)	Tollens reagant (inocolore)	MnO_4^- Purple	$Cr_2O_7^{2-}$ orange
aldehydes	**Yellow orange precipitate**	**White crystals**	**Brick red precipitate**	**Pink**	**Silvery mirror**	**Colorless**	**green**
ketones	**Yellow orange precipitate**	**White crystals**	**blue**	**colorless**	**Colorless**	**purple**	**Orange**

2,4-DNPH: 2,4-dinitro-phenyl-hydrazine
$NaHSO_3$: Sodium bisulfite
tollens : Ammoniacal silver nitrate
MnO_4^-: Permanganate ion
$Cr_2O_7^{2-}$: Dichromate ion

Procedure :

2,4-DNPH & $NaHSO_3$

Add few ml of these substances into a test tube than add few drops of an organic compound

Fehling blue

Add few ml of Fehling into a test tube than add 1 ml of the organic compound, heat the tube using a flame

tollens reagant

add few ml of this reagant in a test tube tahn add 1 ml of an organic compound, shake the mixture and put the test tube in a water bath at 50◦C

schiff's reagant

Add some ml of this reagant into a test tube. Cool the contents of the tube in an ice water bath then add few drops of the organic compound