

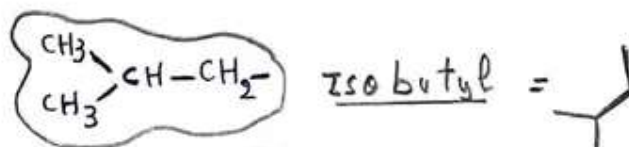
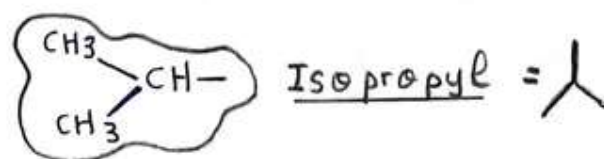
ALCANES $C_n H_{2n+2}$

* Un alcane est un hydrocarbure :

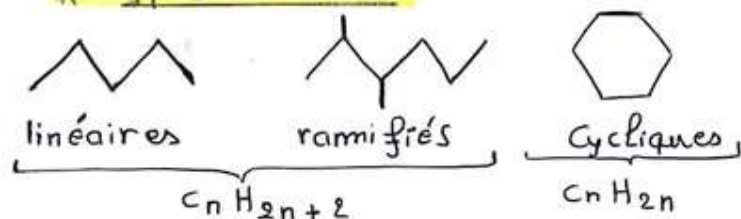
- CH_4 → méthane
- $C_2 H_6$ → éthane
- $C_3 H_8$ → propane
- $C_4 H_{10}$ → butane
- $C_5 H_{12}$ → pentane
- $C_6 H_{14}$ → hexane
- $C_7 H_{16}$ → heptane
- $C_8 H_{18}$ → octane
- $C_9 H_{20}$ → nonane
- $C_{10} H_{22}$ → décane
- $C_{11} H_{24}$ → undécane
- $C_{12} H_{26}$ → dodécane
- $C_{20} H_{42}$ → eicosane

- CH_3 → Méthyle
- $C_2 H_5$ → Éthyle
- $C_3 H_7$ → Propyle
- $C_4 H_9$ → Butyle

Les ALKYL $[C_n H_{2n+1}]$



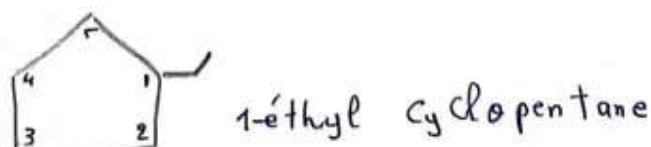
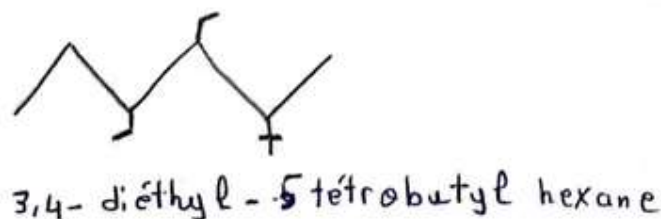
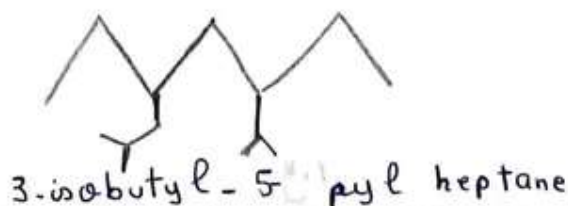
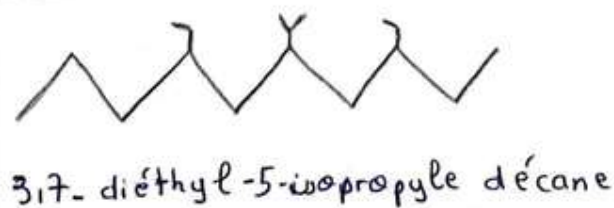
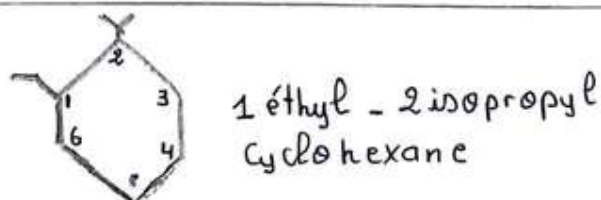
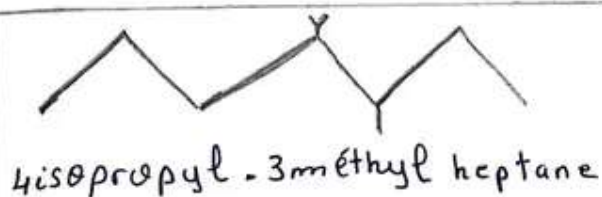
* Types d'alcane :



* à l'état d'un alcane :

$C_1 \rightarrow C_5$ (gaz) ; $C_6 \rightarrow C_{15}$ (liquide) ; $> C_{16}$ (solide)

* des Exemples :



ALCÈNES $C_n H_{2n}$

* Un alcène est un hydrocarbure :

- $C_2H_4 \longrightarrow CH_2 = CH_2 \longrightarrow$ éthène (éthylène)
- $C_3H_6 \longrightarrow CH_3 - CH = CH_2 \longrightarrow$ propène (propylène)
- $C_4H_8 \longrightarrow CH_3 - CH_2 - CH = CH_2 \longrightarrow$ butène
- $C_5H_{10} \longrightarrow CH_3 - CH_2 - CH_2 - CH = CH_2 \longrightarrow$ pentène

* Type d'alcènes :



linéaires



ramifiés





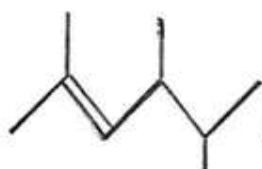


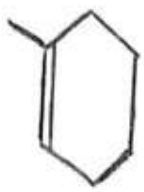
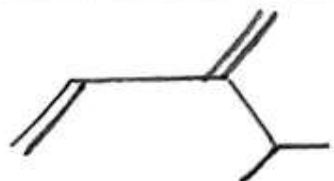
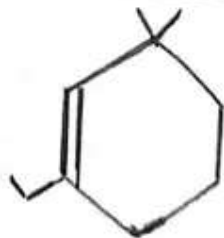


Cycliques

* L'état des alcènes :

$C_1 \longrightarrow C_5$ (gaz) ; $C_6 \longrightarrow C_{11}$ (liquide) ; $> C_{12}$ (solide)

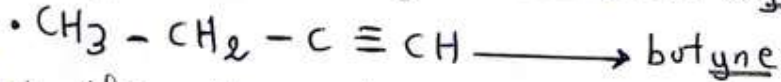
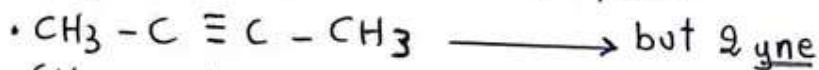
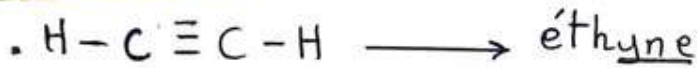
* des exemples :

 pent-1ène	 cyclo pentène
 2-éthyl - pent 1 éne	 Cyclo butène 1,3
 2, 4, 5-triméthylhex 2-ène	 Cyclo 1ène
 2,3-diméthylbut 1 éne	 1,méthyl - Cyclo hexène
 3-isopropyl - butène 1,3	 3,3-diméthyl - 1 éthyl Cyclo hexène

ALCynes $R-C \equiv C-R'$

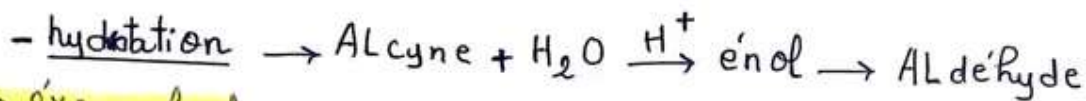
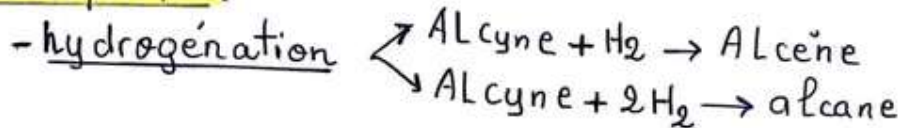
* son de formule brute $C_n H_{2n-2}$, et la terminaison est [yne (\equiv)]

* Nomenclature:



* NB: Un Alcyne Vrai se termine par ($\equiv CH$) et il est un acide car il a le pouvoir de céder H^+

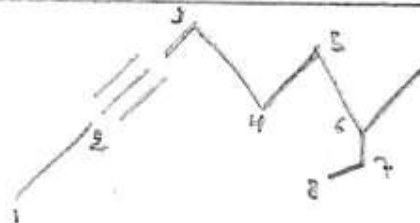
* Ses Propriétés:



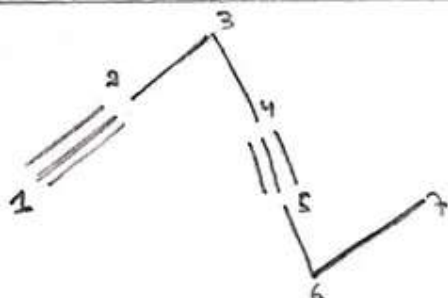
* des exemples:



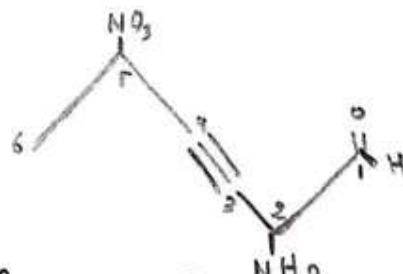
Oct-4-yne



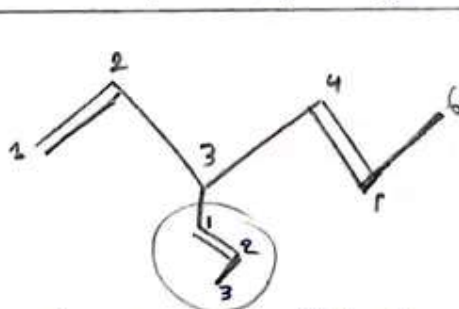
6Méthyl - oct 2 yne



hept - 1,4 - diyne

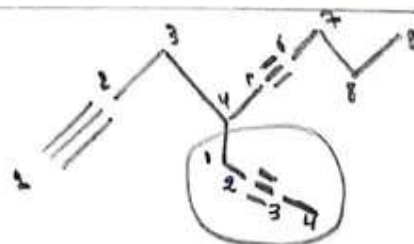


2amino - 5nitro - hex 3yne - 1al



3 (prop-1ényl) hexa 1,4 diène

la = est un sb
Alkényle



4 (but-2-ynyl) - nona 1,5 diyne

la \equiv est un sb
Alkynyle

ALCOOLS $C_n H_{2n+2} O$

* Un alcool est un hydrocarbure qui

Contient un groupe hydroxyle $OH^o [C_n H_{2n+1} - OH]$

- $CH_3 - OH$ → Méthanol
- $CH_3 - CH_2 - OH$ → Éthanol
- $CH_3 - CH_2 - CH_2 - OH$ → Propanol 1
- $CH_3 - \underset{\substack{| \\ OH}}{CH} - CH_3$ → Propanol 2
- $\begin{matrix} CH_3 \\ | \\ CH_3 \end{matrix} - CH - OH$ → Iso propanol
- $CH_3 - CH_2 - CH_2 - CH_2 - OH$ → butanol 1
- $CH_3 - CH_2 - \underset{\substack{| \\ OH}}{CH} - CH_3$ → butanol 2

* Les types des alcools :

* primaire → $C - C^* - OH$

* Secondaire → $C - \underset{\substack{| \\ OH}}{C^*} - C$

* Tertiaire → $C - \underset{\substack{| \\ OH}}{C^*} - C$

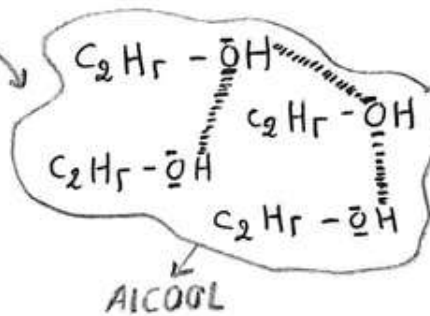
C^* = Carbone fonctionnel qui porte (OH)

* Les Propriétés des Alcools :

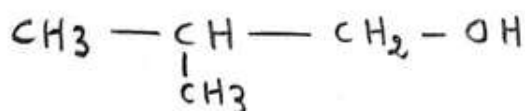
• propriétés chimiques = Oxydation qui donne des Acides

Estérification (ALCOOL + ACIDE \rightleftharpoons ESTER + EAU)

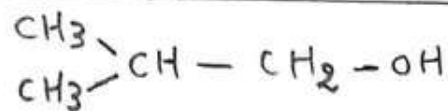
• liaisons hydrogènes
• Ils ont une acidité



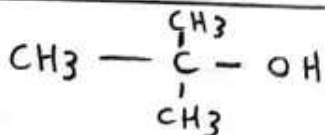
* Des Exemples :



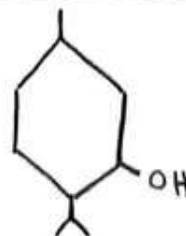
2-Méthyl - Propanol 1



Iso butanol







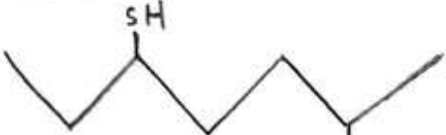
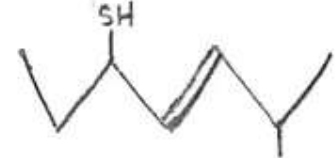


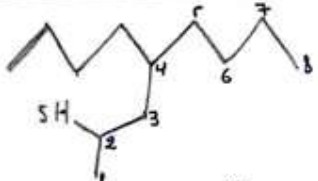
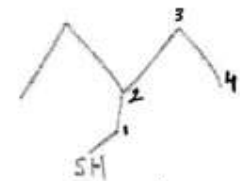
tétra butanol / diméthyl-éthanol



2-isopropyl, 5-méthyl
Cyclohexanol 1

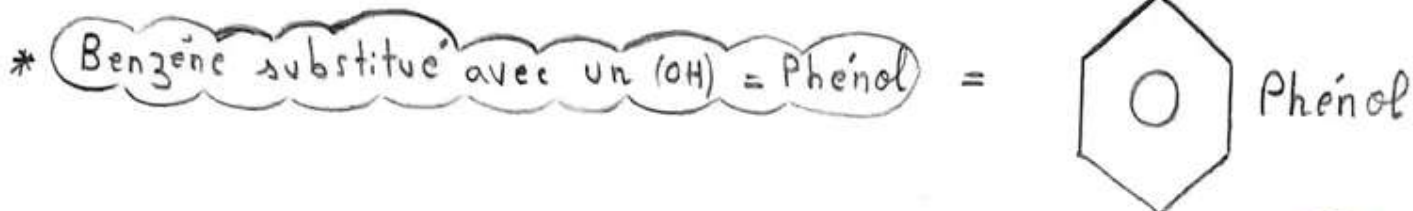
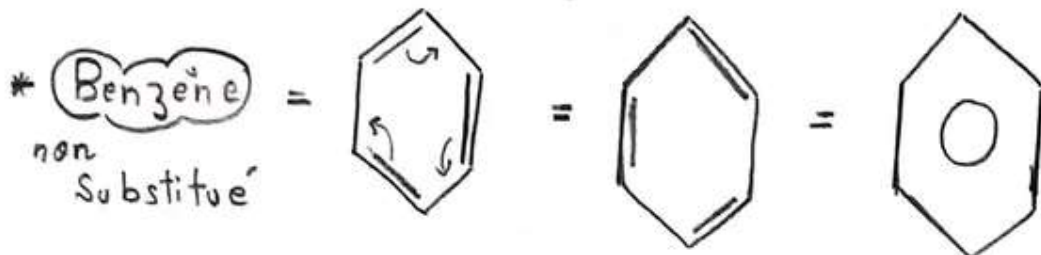
ThiOLS R-SH

* Un thiol est un composé organo sulfuré de formule générique R-SH :

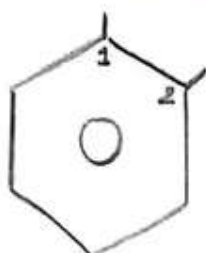
 <p>propanethiol / propane-1-thiol</p>	 <p>3-Méthylbutane-1-thiol</p>
 <p>éthanthiol</p>	 <p>2,3 diMéthyl- butanethiol-1</p>
 <p>6-Méthylheptane-3-thiol</p>	 <p>6-Méthyl-heptène-4-thiol 3</p>
 <p>Cyclohexanthiol</p>	 <p>8-chloro-3-thiol</p>
 <p>4-Butyl-octane-2-thiol</p>	 <p>2-éthyl-butane-1-thiol</p>

Phénols Ar - OH

* Les Molécules Aromatiques (Ar) { Cycliques
Alternance (simple - DL)
Plane



* Les Positions selon les substituants :



- ortho -
(1;2)



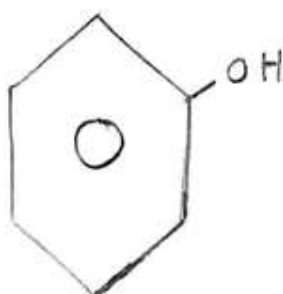
- métha -
(1;3)



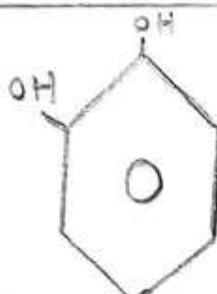
- para -
(1;4)

NB
Phénols = Ar - OH
Thiols = R - SH
Phénols-Thiols = Ar-SH

* des Exemples :



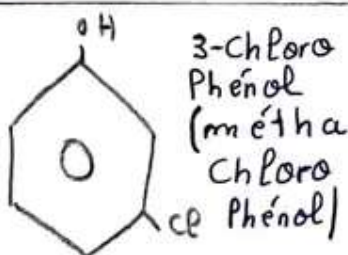
Phénol



2-hydroxy - phénole
(ortho hydroxy Phénole)



4-méthyl
phénole
(Para
méthyl
Phénol)



3-Chloro
Phénol
(métha
chloro
Phénol)



1-éthyl, 2-méthyl
benzène
(ortho
éthyl
méthyl
benzène)

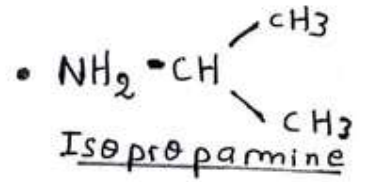


1,3-diméthyl
benzène
(métha
diméthyl
benzène)

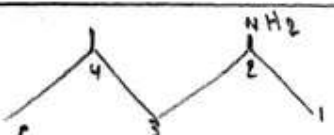
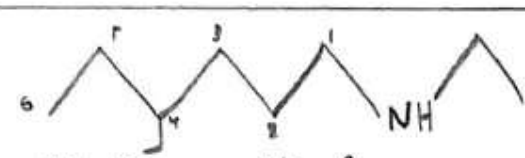
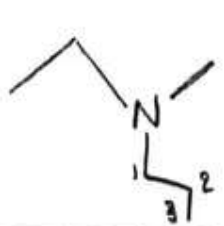
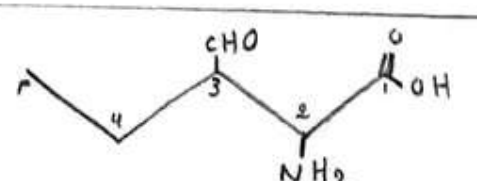
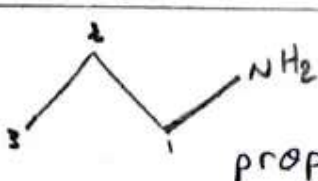
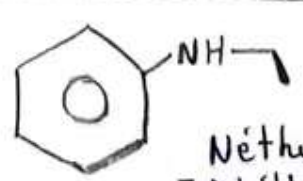
Amines $R-NH_2$

* leurs nomenclature :

- Amines Primaires**
- $CH_3 - NH_2 \rightarrow$ méthane amine
 - $CH_3 - CH_2 - NH_2 \rightarrow$ éthane amine
 - $CH_3 - (CH_2)_2 - NH_2 \rightarrow$ propane amine
 - $CH_3 - (CH_2)_3 - NH_2 \rightarrow$ butane amine
 - $CH_3 - \overset{NH_2}{\underset{|}{CH_2}} - CH_2 - CH_2 - CH_3 \rightarrow$ Pentane 2 amine
- Amines Secondaires**
- $CH_3 - \overset{NH-CH_2-CH_3}{\underset{|}{CH_2}} - CH_2 - CH_2 - CH_3 \rightarrow$ Néthyl - pentane 2 amine
 - $CH_3 - CH_2 - CH_2 - NH - CH_3 \rightarrow$ Nméthyl - propane 1 amine
 - $CH_3 - NH - CH_2 - CH_2 - \underset{CH_3}{\underset{|}{CH}} - CH_3 \rightarrow$ (N,3) diméthyl - butane 1 amine
- Amines tertiaires**
- $CH_3 - CH_2 - \underset{CH_3}{\underset{|}{N}} - CH_3 \rightarrow$ (N,N) diméthyl éthane amine
 - $CH_3 - \underset{CH_3}{\underset{|}{N}} - \underset{CH_3}{\underset{|}{CH}} - CH_2 - CH_3 \rightarrow$ (N,N) diméthyl butane 2 amine



* des exemples :

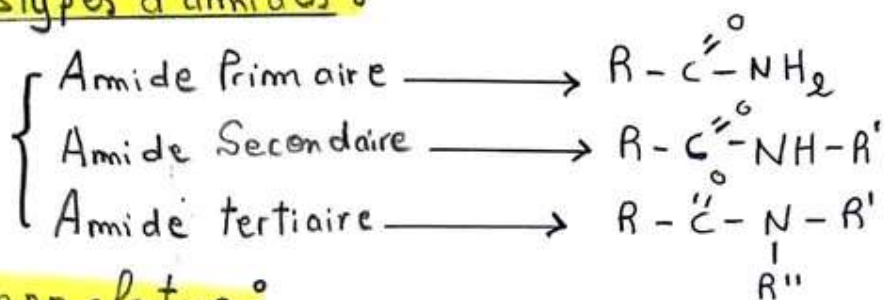
 <p>4méthyl - pentane 2 <u>amine</u></p>	 <p>4éthyl - N éthyl - hexane 1 <u>amine</u></p>
 <p>Néthyl - Nméthyl propane 1 <u>amine</u></p>	 <p>Acide - 2Amino - 3 formyle - pentanoïque</p>
 <p>propane 1 <u>amine</u></p>	 <p>Néthyl - benzanamine = Néthyl aniline</p>

Amides $R-CONH_2$

définition :

* Les amides sont les dérivés des Acide $R-C(=O)-NH_2$

* Les types d'amides :



* Nomenclature :

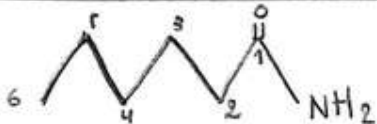
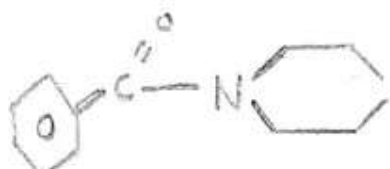
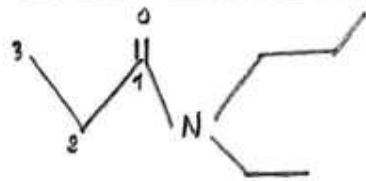
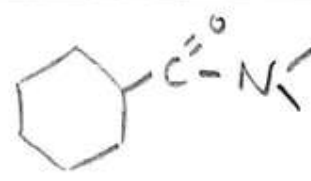
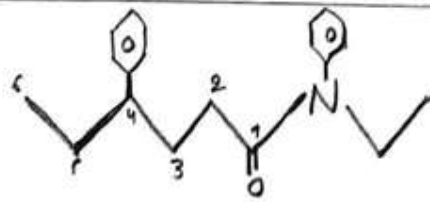
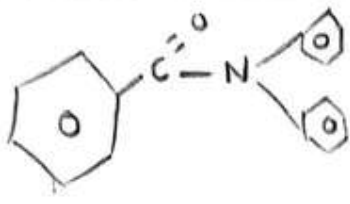
$H-CONH_2 \longrightarrow$ Méthanamide (formamide)

$CH_3-CONH_2 \longrightarrow$ éthanamide (acétamide)

$CH_3-CH_2-CONH_2 \longrightarrow$ propanamide

$CH_3-(CH_2)-CONH_2 \longrightarrow$ butanamide

* des exemples :

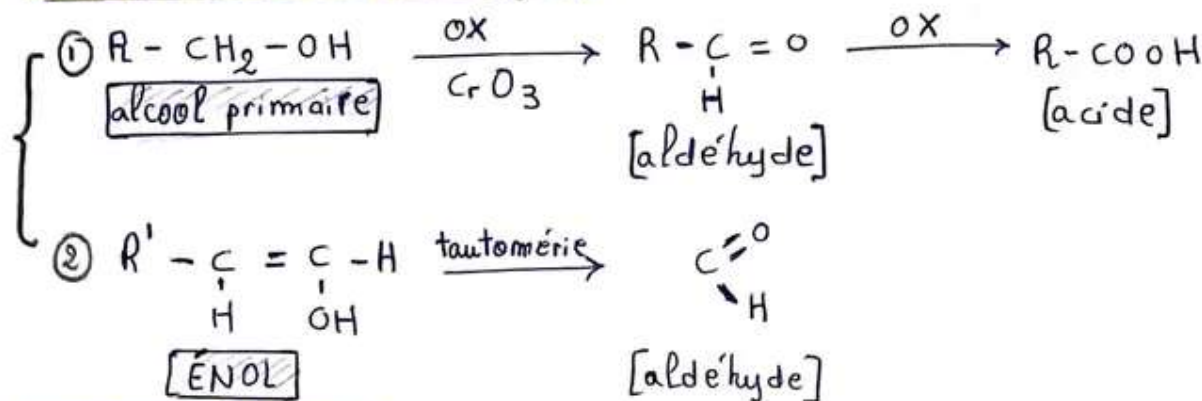
 <p>hexanamide</p>	$NH_2-C(=O)-NH_2$ urée
$H-C(=O)-N(CH_3)_2$ (N,N) diméthyl formamide	 <p>(N,N) dipropyl benzanamide</p>
 <p>Néthyl - Npropyl - propanamide</p>	 <p>(N,N) diméthyl - cyclohexanamide</p>
 <p>(N,N) phényl,éthyl - 4phényl-hexanamide</p>	 <p>(N,N) diphényl - benzanamide</p>

- est apotique
- Sa red
donne
un alcool I

ALDéhydes $R-COH$

* On trouve toujours $R-\underset{\text{H}}{\underset{|}{C}}=O$ à l'extrémité, et la nomenclature se termine par (al)

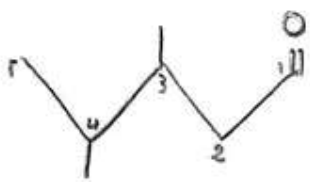

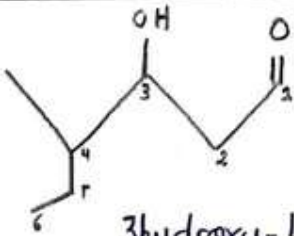
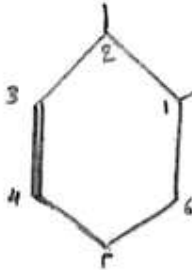
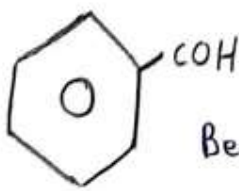
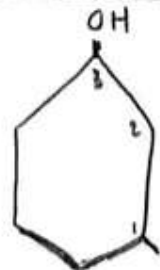
* L'obtention des Aldéhydes :



* Nomenclature :

- $H-COH \longrightarrow$ Méthanal (formaldéhyde)
- $CH_3-COH \longrightarrow$ Éthanal (Acétaldéhyde)
- $CH_3-CH_2-COH \longrightarrow$ Propanal (Propinal)
- $CH_3-CH_2-CH_2-COH \longrightarrow$ butanal (butoranal = butirique)

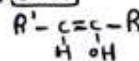
* des Exemples :

 <p>3,4 diméthyl-Pentanal</p>	 <p>Méthahydroxybenzaldéhyde</p>
 <p>3hydroxy-4méthyl-hexanal</p>	 <p>2Méthyl - Cyclohexène 3 Carbaldéhyde</p>
 <p>Benzaldehyde</p>	 <p>3hydroxy Cyclohexane carbaldéhyde</p>

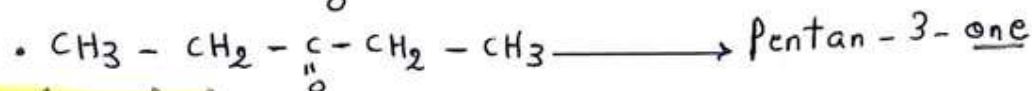
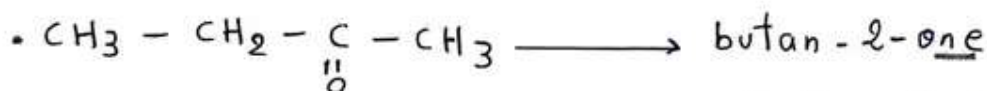
Cétones $R'-CO-R$

* on trouve toujours $R'-CO-R$ au milieu, et la nomenclature se termine par (one)

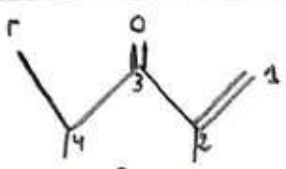
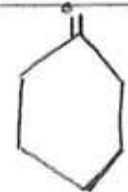
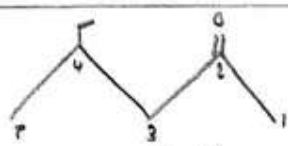
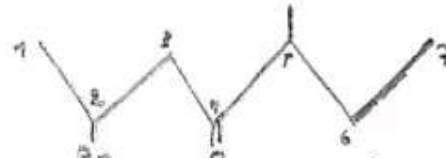

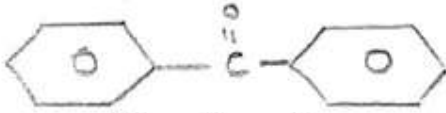
* Obtention des cétones à partir d'un alcool, secondaire, ou d'un énol.



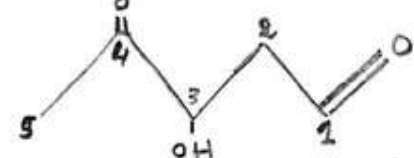
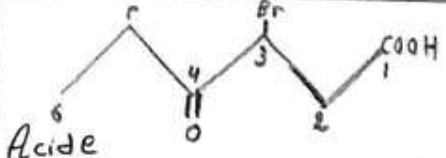
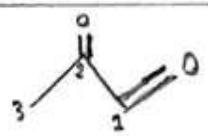
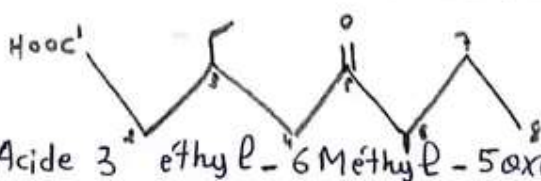
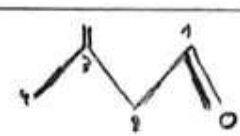
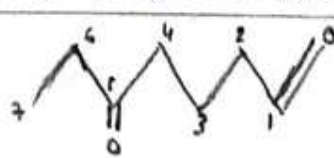
* CO Prioritaire



* des exemples :

 <p>2,4 diméthyl - 1ène - pentanone 3</p>	 <p>Cyclohexanone</p>
 <p>4-éthyl - pentan 2 one</p>	 <p>2Bromo - 5méthyl - heptan 4 one</p>
 <p>Méthyl Phényl cétone</p>	 <p>Di phényl - cétone</p>

* CO non prioritaire

 <p>3 hydroxy - 4oxo - pentanal</p>	 <p>Acide 3bromo - 4oxo - hexanoïque</p>
 <p>2-oxo - propanal</p>	 <p>Acide 3 éthyl - 6 Méthyl - 5oxo - octanoïque</p>
 <p>3oxo - butanal</p>	 <p>7oxo - heptanal</p>

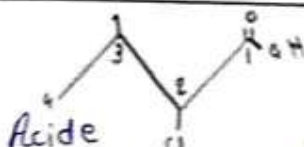
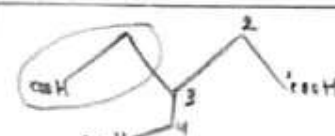
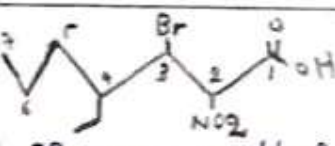

Acides Carboxyliques $R-COOH$

mono
Acides

- $HCOOH \longrightarrow$ Acide méthanique (formique)
- $CH_3 - COOH \longrightarrow$ Acide éthanique (Acétique)
- $CH_3 - CH_2 - COOH \longrightarrow$ Acide propanique
- $CH_3 - (CH_2)_2 - COOH \longrightarrow$ Acide butanique

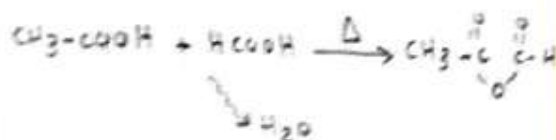
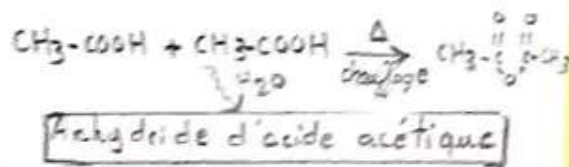
di
Acides

- $COOH - COOH \longrightarrow$ oxalique
- $COOH - CH_2 - COOH \longrightarrow$ Propan diacide
- $COOH - (CH_2)_2 - COOH \longrightarrow$ butan diacide
- $COOH - CH = CH - COOH \longrightarrow$ butène diacide 1,4

 <p>Acide 2 Chloro - 3 Méthyle - butan 1 oïque</p>	 <p>Acide - 3 carboxyméthyle - pentane 1,5 dioïque</p>
 <p>Acide 3Bromo - 4éthyle - 2nitro - heptan 1 oïque</p>	 <p>Acide - 3 carboxy éthyle - nonan 1,9 one</p>
COOH prioritaire	COOH Non prioritaire

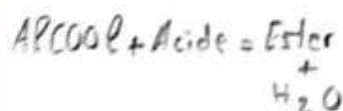
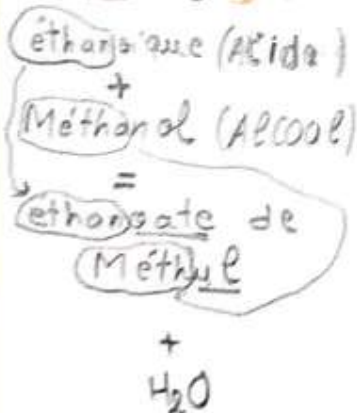
- dérivés -

Anhydride

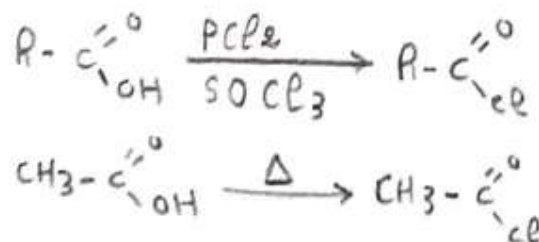


Anhydride d'acide acétique
et formique

Ester



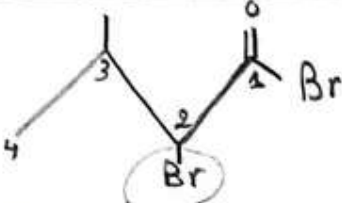

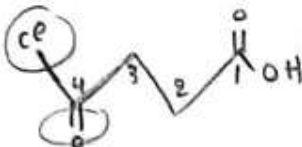
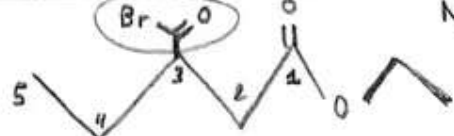
Chlorure d'acyle



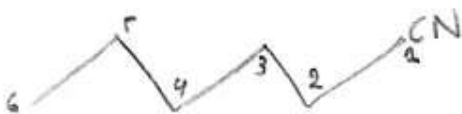
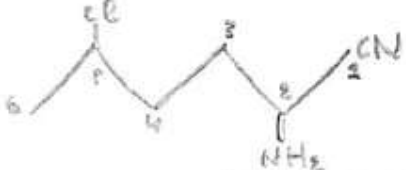
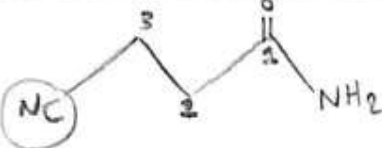

chlorure d'acyle
acétique

Halogénures $R-\overset{\overset{O}{\parallel}}{C}-X$

* Nomenclature du halogénure d'alkyle

 <p>prioritaire</p> <p>Bromure de 2-Bromo, 3-chloro - butanyle</p>	 <p>prioritaire</p> <p>chlorure de butanyle</p>
 <p>Non-prioritaire</p> <p>Acide 4-chloro - 4-oxo - butanoïque</p>	 <p>Non-prioritaire</p> <p>3-bromocarbonyl pentanoate d'éthyle</p>

Nitrile $R-C\equiv N$

 <p>prioritaire</p> <p>hexane - 1 - nitrile</p>	 <p>prioritaire</p> <p>2-amino - 5-chloro - butane 1 nitrile</p>
 <p>Non prioritaire</p> <p>3 cyano - propanamide</p>	 <p>Non prioritaire</p> <p>3 cyano - butanoate de méthyle</p>

Classement des Fonction

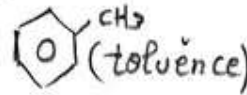
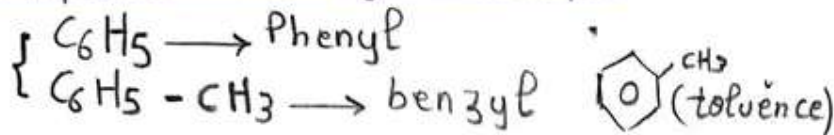
- ① Acide carboxylique ($COOH$) → Oïque
- ② Amydride d'acide $R-C(=O)-O-R'$
- ③ ester $R-C(=O)-O-R'$
- ④ halogénure d'acide
- ⑤ Les Amides

- ⑥ Nitriles
- ⑦ Les Aldéhydes
- ⑧ Les Cétones
- ⑧ Alcool
- ⑨ Amine
- ⑩ éther
- ⑪ Alcène - Alcyne - Alcane
- ⑪ Dérivés d'halogène

Les dérivés du benzène



* C'est un liquide incolore, Aromatique



<p>4Phényl - nonane</p>	<p>chlorobenzène / Chlorophényl</p>	<p>méta nitro phénol</p>
<p>Acide 5 Phényl Pentanoïque</p>	<p>Sulfo benzène</p>	<p>phénol</p>
<p>éthanoate de Phényl</p>	<p>Acide benzoïque</p>	<p>benzal / benzène aldéhyde</p>
<p>1 phényl - heptane</p>	<p>toluène</p>	<p>Aminime</p>
<p>benzoate de butyle</p>	<p>Styrène</p>	<p>Cumène / isopropyl benzène</p>
<p>(1,2,4) chloro benzène</p>	<p>ortho chloro toluène</p>	<p>m. crésol / m. méthyl phénol</p>
<p>TNT tétr(2,3;4,6) Nitro Toluène</p>	<p> $S_{b1}/S_{b2} \rightarrow O$ $S_{b1}/S_{b3} \rightarrow m$ $S_{b1}/S_{b4} \rightarrow p$ </p>	<p>2hydroxy benzoïque 2hydroxy - cyclohexane carboxylique</p>
<p>naphtalène</p>	<p>Phényl</p>	<p>Styrène</p>
<p>Xylène</p>	<p>Cumène</p>	<p>benzyl</p>
<p>Acide 2hydroxy benzoïque</p>		<p>1-éthyl-2-méthyl-benzène</p>