

- 1) Nomenclature التسمية
- 2) isomerism المتساويات
- 3) Hybridization التهجين

• Nomenclature → تسمية المركبات = التسمية
of organic compound

• organic compound المركب = العضوي

↳ it is a compound which contain carbon atom. / مركب = يتألف من ذرات كربون.

• Hydro carbon الهيدروكربون

↳ it is a compound which contain carbon atom and hydrogen atom
↳ مركبات تحتوي على ذرات كربون وهيدروجين.

• Types of hydrocarbon.

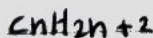
• Aliphatic compound

↓
cyclic

↓
A cyclic

↓ Saturated

* Alkane

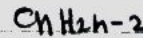


↓ unsaturated

* Alkene



* Alkyne



• Aromatic compound

↳ compound which contain Benzene Ring



II Saturated hydro carbon الهيدروكربونات المشبعة

مركبات تحتوي على كربون + هيدروجين ولا تحتوي على روابط ثنائية
 « كل الروابط الموجودة في السلسلة احادية « بسيطة » قوية »

* Alkanes « Paraffins »

- General formula C_nH_{2n+2} « عدد ذرات الهيدروجين $2n$ »
- Functional group C-C « الرابطة بين » Single bond
- Name of Family ane
- Hybridization sp^3
- Bond angle $108^\circ, 24'$
- Geometry Tetrahedral
- Bond length $1.54 \text{ \AA}$

number of carbon atom	Name of Alkane	number of carbon atom	name of Alkane
1	meth ane	6	Hex ane
2	eth ane	7	Hept ane
3	Prop ane	8	oct ane
4	but ane	9	Non ane
5	Pent ane	10	dic ane

II Common name

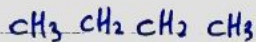
الاسم الشائع

الاسم الشائع لكل ذرات الكربون في السلسلة ثم اكتب الـ IUPAC

Ex: $\text{CH}_3\text{CH}_2\text{CH}_3$ → Propane

• normal

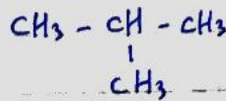
* إذا كانت السلسلة مستقيمة



n-butane

• iso

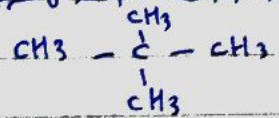
* إذا كانت السلسلة متفرعة واحدة



iso-butane

• neo

* إذا كانت السلسلة متفرعة



neo-pentane

II IUPAC name

• حدد أطول السلسلة كربون

• ترقيم السلسلة من الناحية الأقرب للفرع

• في حالة تكرار نفس التفرع يتم إيجافه (2 → Di / 3 → Tri / 4 → Tetra)

• يراعى الترتيب الأبجدي عند التسمية أو الترتيب إذا كان

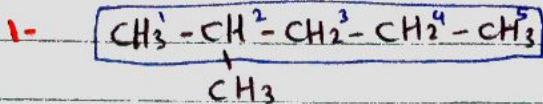
• نفس الفرع

↓ NH_2 amino	↓ CN cyano	↓ NO_2 nitro	↓ I iodo	↓ F fluoro	↓ Cl chloro	↓ Br bromo
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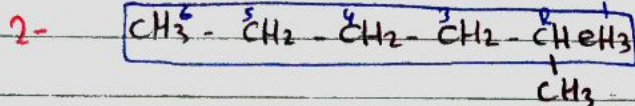
• يتم وضع (و) بين الأرقام (-) بين الحروف والأرقام

• أول حرف بعد الرتبة Capital

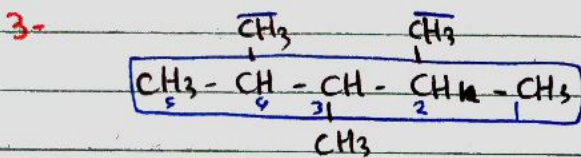
ex)



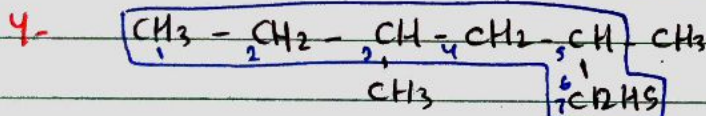
2-methyl Pentane



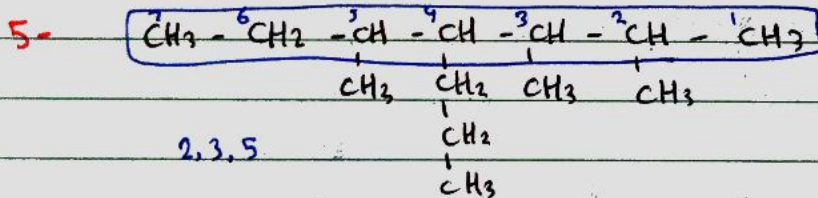
2-methyl Hexane



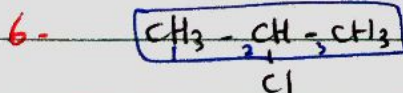
2,3,4 Trimethyl Pentane



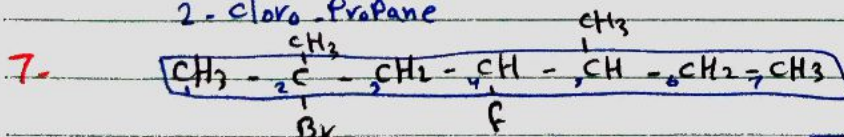
3,5 - Dimethyl heptane



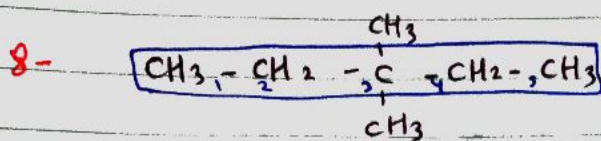
2,3,5 - methyl - 4-Propyl - Heptane



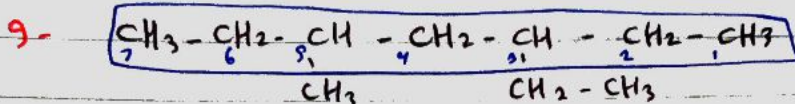
2-chloro Propane



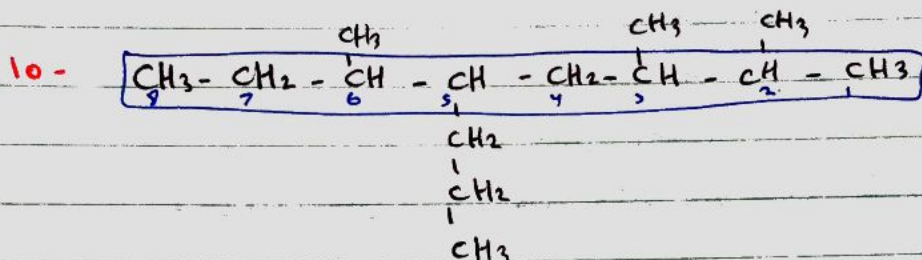
2-Bromo - 4-Floro , 2,5 methyl Heptane



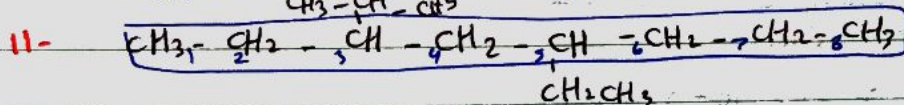
3,3 - Dimethyl Pentane



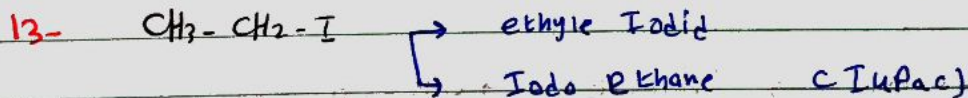
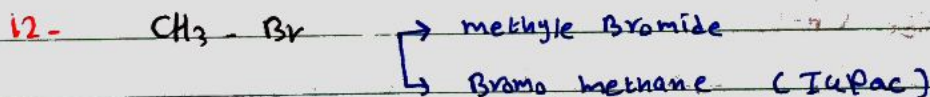
3, Ethyl - 5, methyl Heptane



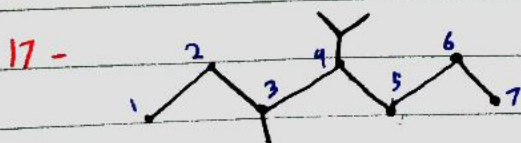
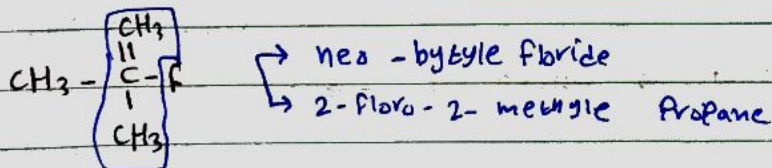
2,3,6 - Trimethyl - 5 - Propyl Octane



5, ethyl - 3 - Isopropyl Octane



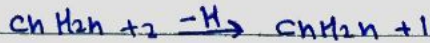
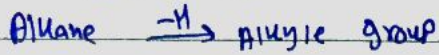
14- 15-



3 - methyl - 4 - Isopropyl heptane

* Alkyle group's R

لإعطائه عن Alkane خالو من ذرة هيدروجين.



ex))



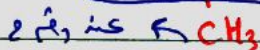
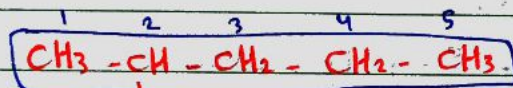
methane methyle group



ethane ethyle group

* مجموعة الكيل (R) عطائه عن مجموعة هيدروجين (مفقعة)

ex



2-methyle - Pentane

* Alkyle halide (R-X)

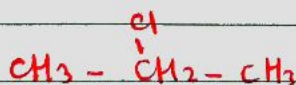


chloro ethane



1-chloro Propane

ex))



2-chloro- propane

Lec ?

* Cyclo Alkane

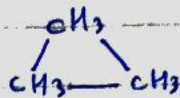
الألكانات الحلقية

تقسم التسمية لأن قبل كلمة cyclo

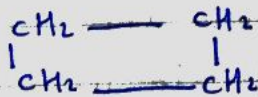
ex)



cyclo propane



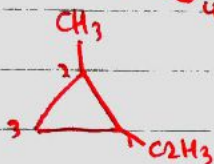
cyclo butane



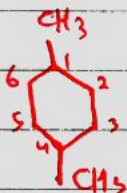
cyclo Hexane



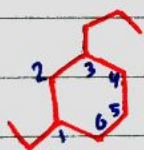
cyclo pentane



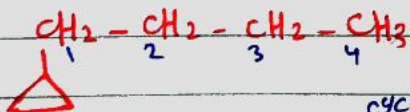
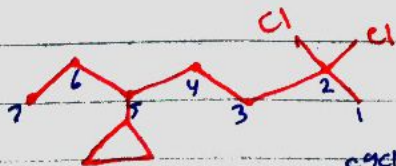
1-ethyl-2-methyl cyclo propane



1,4-Dimethyl cyclo Hexane



1-ethyl-3-Propyl- cyclo Hexane

cyclo
1-Propyl butanecyclo
2,2-dichloro-5-Propyl Heptane

21 Alkensä C_nH_{2n}

C_nH_{2n} saturated compound

or double bond π is

- General formula C_nH_{2n}
- Function Group double bond $(=)$
- Family name ene
- Hybridization sp^2
- Bond length 1.34 Å
- Bond Angle 120°
- Geometry Trigonal Pyramidal

* Nomenclature

الترتيب

↳ common name

Alk + ylene

- 1) $CH_3 - CH = CH_2$ Propylene
- 2) $CH_3 - CH_2 - CH = CH_2$ butylene
- 3) $CH_3 - CH = CH - CH_3$ B-butylene
- 4) $CH_2 = CH - Cl$ Vinyl chloride
- 5) $CH_2 = CH - CH_2 - Cl$ Allyl chloride
- 6) $CH_2 = CH_2$ ethylene
- 7) $CH_2 = C = CH_2$ Allene

Notes

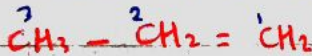
- 1) $CH_2 = CH$ Vinyl or ethyl
- 2) $CH_2 - CH = CH_2$ Allyl or Propyl
- 3) $CH_2 = C = CH_2$ Allene

21 IUPAC Name

- حدد أطول السلسلة كربونية تحوّل على الرابطة الثانية
- تقوم بالتوقيع من الطرف الأخرى للمراجه الثانية ويسمى من الختم
- لوضع أكثر من رابط مزدوج يقع كـ di, ene Tri

ex) $CH_2 = CH_2$

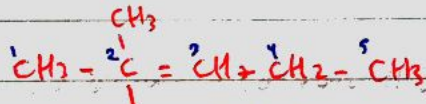
ethene / ethylene



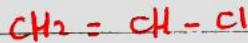
1-propene



2-Butene



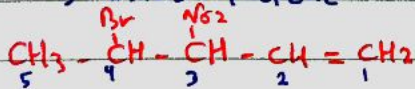
2-methyl-2-pentene



chloro ethene



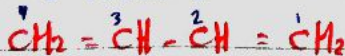
3-chloro-propene



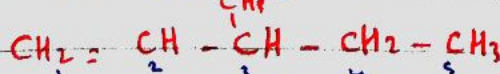
4-Bromo-3-Nitro-1-pentene



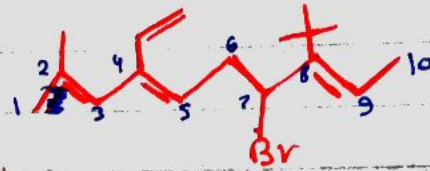
2-pentene



1,3-Butadiene

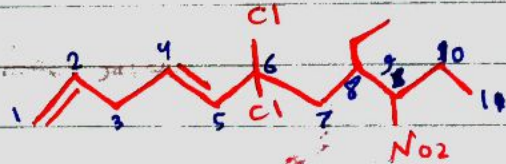


3-methyl-1-pentene



7-Bromo-2-methyl-8-neobutyl

4-vinyl-2,5,8-decatriene



6,6-Dichloro-8-ethyl-9-Nitro-

undeca-1,4-diene.

- Cyclo Alkene الألكينات الحلقية
- (1) - تسم الألكينات يختلف حسب cyclo و π عدد.

ex



cyclo butene

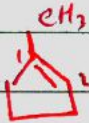


cyclo Pentene



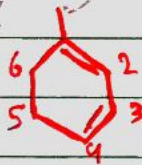
cyclo hexene

- (2) في حالة وجود مجموعات متبادلة
- اعطى الرابطة الشائعة رقم (1,2) وتتركز حيث نضع على اقل فرق

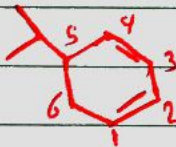


1-methyl - cyclo Pentene

- (3) في حالة وجود 2 double bonds (2 π) تسمى diene



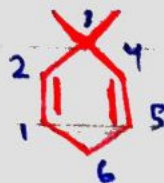
1,3 cyclo Hexadiene



-5-iso Propyl - 1,3- cyclo Hexadiene

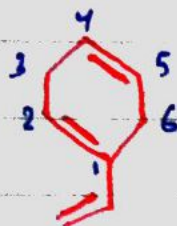
ex 1)

11



3,3-Diethyl-1,4-cyclohexadiene

21



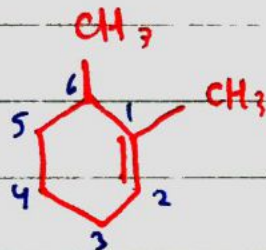
1-Vinyl-1,4-cyclohexadiene

31



3-Allyl-6-vinyl-1,4-cyclohexadiene

41



1,6-Dimethylcyclohexane

31 Alkynes Asyle

- unsaturated compound contain triple bond ($\equiv$)

مركب غير مشبع يحتوي على رابطة ثلاثية

General formulae	$C_n H_{2n-2}$
Function Group	($\equiv$) Triple bond
Family name	yne
Hybridization	sp
Bond length	1.2 $\text{\AA}$
Angle	180 $^\circ$
Geometry	Linear

II Common name النام الشائع



II $CH \equiv CH$ Acetylene

21 $CH \equiv C - CH_3$ methyl - Acetylene

31 $CH \equiv C - CH_2CH_3$ ethyl Acetylene

41 $CH_3 - C \equiv C - CH_3$ Dimethyl Acetylene

2) IUPAC name

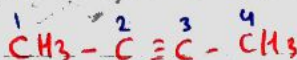
• حدد أطول السلسلة كربونية تحتوي على $C \equiv C$ وتسميها الألفان + dyne

• اقم من الطرف الأقرب إلى $C \equiv C$

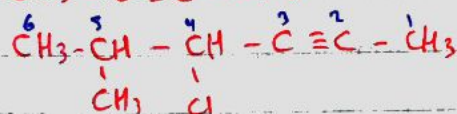
• يتم تسمية الفروع بحسب الألفان مع مراعاة الترتيب الأبجدي

• حاله تكرار الفروع 4-Tetra / 2-di / 3-Tri

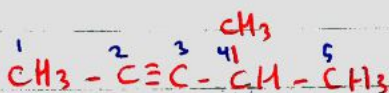
ex))



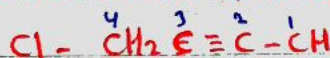
2-butyne



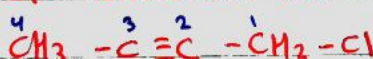
4-chloro - 5-methyl - 2-Hexyne



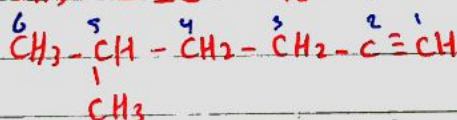
4-methyl - 2-Pentyne



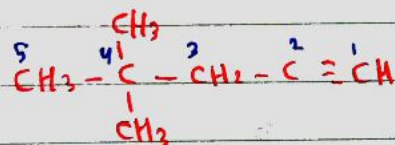
3-chloro - 2-Pentyne



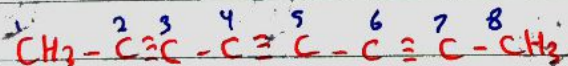
1-chloro - 2-Pentyne



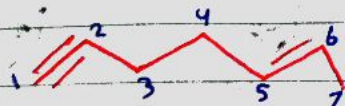
5-methyl - hexyne



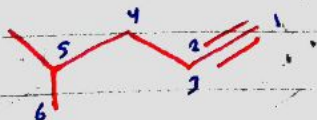
4,4-methyl Pentyne



2,4,6 octyne

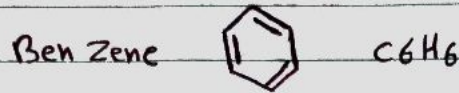


5-heptyne, 2-heptyne

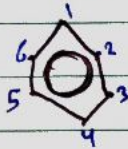


5-methyl - Hexyne

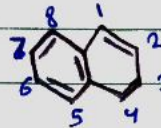
21 Aromatic Hydro carbons (Ar-H)



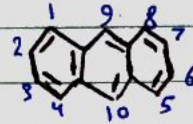
Aromatic Hydrocarbons as:



Benzene
 C_6H_{12}



Napthalene
 $C_{10}H_8$



Athra cene
 $C_{14}H_{10}$

Aromatic → Mono substituted ring
→ Di " "
→ Poly " "

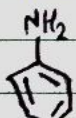
1 For mono

حلقة بنزين بغير عائله

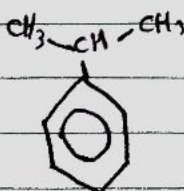
مجموعات نقطه اللغه جديده
" حلقه بنزين "



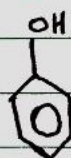
Toulene



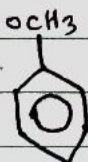
Aniline



Cum ene



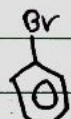
Phenol



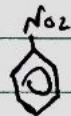
Anical

OCH_3 → methoxy
 NH_2 → Aino

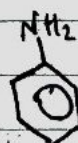
مجموعات لا تفسد الحلقة جديده
" جوده بنزين "



Bromo Benzene



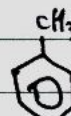
Nitro Benzene



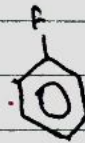
Amino Benzene



chloro Benzene



methyle Benzene



Floro Benzene

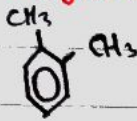
21 For Di

طلة التزيت على تفريخ

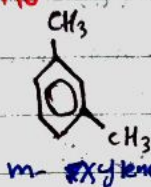
2 or 6	ortho	(o-)
3 or 5	meta	(m-)
4	para	(p-)

22 المجموعتين بظيان RT جديد

• Xylene C_8H_{10}



o-xylene

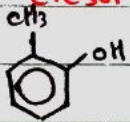


m-xylene

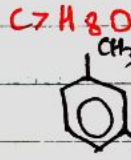


p-xylene

• Cresol C_7H_8O



o-cresol

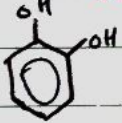


m-cresol

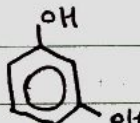


p-cresol

• $C_6H_6O_2$



catechol



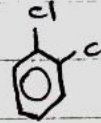
resorcinol



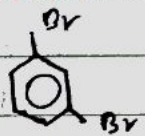
hydroquinone

22 المجموعتين لا يظيان RT جديد

• لولاجوية صافيت نجر المظف Di

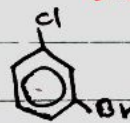


o-dichlorobenzene



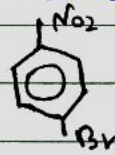
m-dibromobenzene

• لولاجوية وني ايد



3-Bromo-1-chlorobenzene

(91) m-Bromochlorobenzene

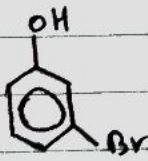


4-Bromo-1-Nitrobenzene

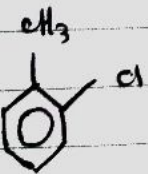
(91)

p-bromonitrobenzene

23 مزج جديد RT المظف و مظف



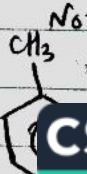
m-Bromophenol
(91)



o-chloroaniline
(91)
2-chloro-1-amine



p-nitroaniline
4-nitro-1-amine



m-nitrotoluene



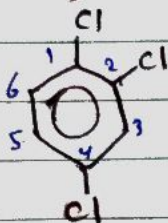
3 For Poli

3 مزوج أو أكثر

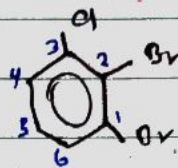
11 المزدوجات هي لا أكثر من جديد

في حالة تسمية المركبات

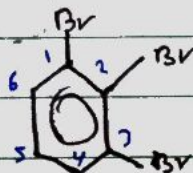
2 في حالة اختلاف المجموعات



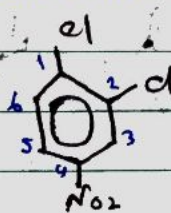
1,2,4 - tri chloro benzene



1,2 Brom - 3 chlor Benzene

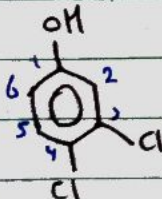


1,2,3 tri Bromo benzene

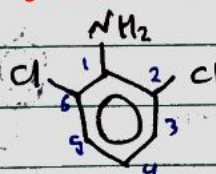


1,2 chloro - 4-Nitro Benzene

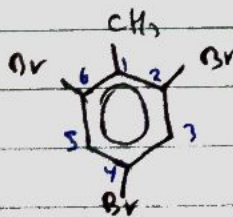
2 في حالة وجود مجموعة متعلل المركب في صيغة تسمية 1
وقدر الحصول على اقل ترتيب



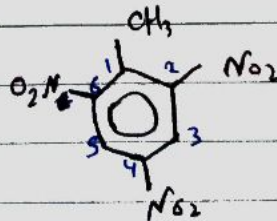
3,4 chloro Phenol



2,6 dichloro - Aniline

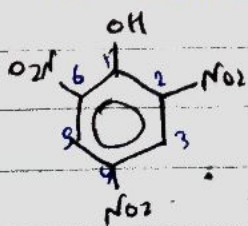


2,4,6 Tri bromo toluene



2,4,6 Nitro Toluene

(N.T.N)



2,4,6 Nitro Phenol



CamScanner

(T.N.B)

Lec 4

* Alcohols

(R-OH)

الكحوليات

 $C_nH_{2n+2} + OH / C_nH_{2n+2}O$

Types of Alcohol

① Mono of alcohol

• contain one OH

ex) CH_3-OH Methyl Alcohol

② di " "

• " two OH

ex) $CH_3-CH-CH_2$
 | |
 OH OH

③

• Propylene glycol →

ex) CH_2-OH
 |• ethyleneglycol → CH_2-OH

③ Trihydric alcohol

• contain three OH

ex) CH_2-OH
 |
 CH_2-OH glycerol
 |
 CH_2-OH 1,2,3 Propantriol

* Nomenclature

I Common name

Alkyle Alcohol

Note

ex)

• CH_3-OH

methyl Alcohol

iso → تفريع

• $CH_3-OH-CH_2-CH_3$

ethyl Alcohol

n → سلسله

• $CH_3-CH_2-CH_2-OH$

n-Propyle Alcohol

Tert (neo) →

• $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-OH$

neo-butyle Alcohol

تفرع في اول السلسله

vinyle = $CH_2=OH$ • $CH_2=CH-OH$ vinyle Alcohol ($CH_2=CH$)• $CH_2=CH-CH_2-OH$ Allyle Alcohol ($CH_2=CH-CH_2$) Allyle• CH_3
 |
 $CH_3 > CH-OH$

iso Propyle Al



CamScanner

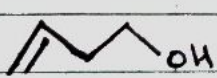
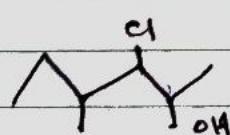
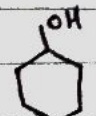
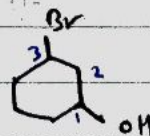
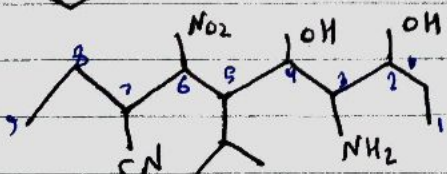
2) Iupac Name

- عدد الذرات الكربونية تحدد اسم OH
- تقوم بإضافة كالكلام يتميل بحرف ع بدوق OH
- الأولوية في الترقيم الأقرب من OH

examples

Common

Iupac

- $\text{CH}_3\text{-OH}$ methyl Alcohol methanol
- $\text{CH}_3\text{CH}_2\text{-OH}$ ethyle Alcohol ethanol
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ Propyle Alcohol 1-Propanol
- $\text{Br}-\overset{3}{\text{CH}_2}-\underset{\text{CH}_3}{\overset{2}{\text{CH}}}-\text{CH}_2-\text{OH}$ 3-Bromo-2-methyl-1-Propanol
- $\overset{1}{\text{CH}_3}-\overset{2}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$ neo butyle Alcohol 2-methyl-2-Propanol
- $\text{CH}_2=\text{CH}-\text{OH}$ vinille Alcohol ethanol
- $\text{CH}_2=\text{CH}-\text{CH}_2-\text{OH}$ Allyle Alkhol prop-2-en-1-ol
- $\text{CH}_3-\overset{2}{\underset{\text{CH}_3}{\text{C}}}-\overset{1}{\text{CH}_3}-\text{OH}$ neo Pentyle alcohol 2,2-dimethylpropanol
-  3-butenol
-  3-Chloro-4-methyl-2-hexanol
-  cyclo Hexanol
-  3-Bromo-cyclo Hexanol
-  3-Amino-5-nitro-2,4,6-trihydroxy-2-methylheptane

* Ether (-O-)

1) Common Name

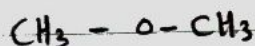
تقوم بكتابة المجموعتين المتصلتين بـ (O).

تقع في نهاية الاسم على ether

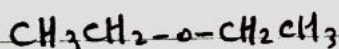
في حالة كتابة المجموعتين تقع المقطع في

في حالة الاختلاف (تبدأ بـ i) .

1) Symmetric (simple ether)



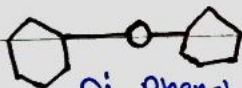
Di methyle - ether



Di ethyle - ether



Di vinyl ether

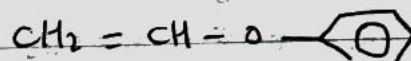


Di Phenol ether

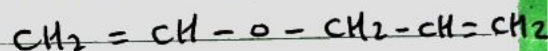
2) Asymmetric



ethyl methyle ether



Phenol vinyl ether

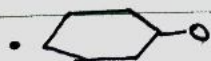
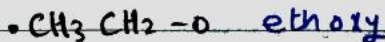
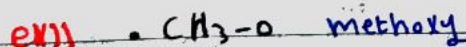


Allyl vinyl ether

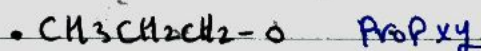
2) IUPAC Name

* يتم اختيار المجموعتين الأقل في أعداد الكربون وكتبها Alkoxy

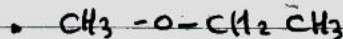
والجزء الآخر فترجيه للأول.



Phenoxy



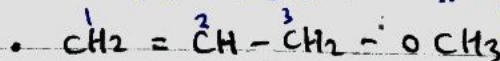
Di methyle ether // methoxy methane



ethyl methyle ether // methoxy ethane



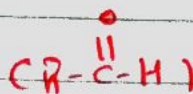
Di vinyle ether



Allyl methyle ether // 3 methoxy

prop-1-ene

* Aldehyde
↳ ketons



* ليس الألكايد من تقسيم الهيدروكربون مع هذ
و هو مشتق من aldehyde

1) Common name

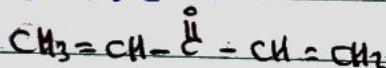
* Symmetric



dimethyl keton

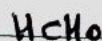


diethyl keton

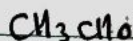


di vinyl keton

* As symmetric



Formal aldehyde



Acetaldehyde

2) IUPAC name

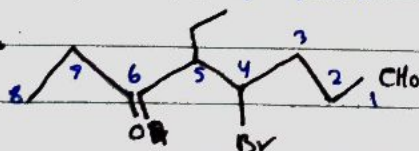
" Alkanal "

• حدد أطول السلسلة المحتوية على $R-H$ ، رتقم من الأقرب لـ CHO
• بين التعريفات مع وضع أرقام لها و تسمى الرتقم الأيمن
• حذف حرف e وإضافة al

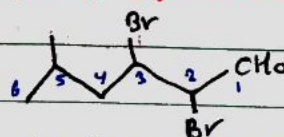
• $HCHO$ methanal

• CH_3CHO ethanal

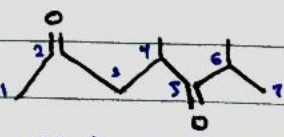
• CH_3CH_2CHO Propanal



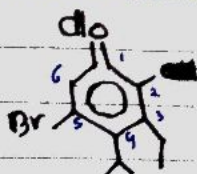
4-bromo - 5-ethyl - 6-oxo - heptanal



2,3-dibromo - 5-methyl hexanal



4,6-dimethyl - 2,5-heptanedione



5-bromo - 3-ethyl - 4-isopropyl - 2-methyl benzaldehyde

* Carboxylic acid

G.n.f (R-coolt)

$$C_n H_{2n} O_2$$

* Common name

• HCOOH Formic Acid

• CH_3COOH Acetic Acid

• $\text{CH}_3\text{CH}_2\text{COOH}$ methyle acetic acid

• CH_3
 CH_3 $\searrow$ CHCOOH Dimethyl acetic acid

- $\text{CH}_3(\text{CH}_2)_4\text{COOH}$ Hexanoic acid

* Iupac name

← COOH له الاولوية على OH طابه ودرجة ايه ا منه عنه.

- HCOOH methanoic acid

- CH_3COOH ethanoic acid

- $\text{CH}_3\text{CH}_2\text{COOH}$ Propanoic acid

- $\text{CH}_3(\text{CH}_2)_3\text{COOH}$ butanoic acid

$$\text{CH}_3 - \underset{\text{CH}_3}{\underset{6}{\text{CH}}} - \underset{\text{CH}_2}{\underset{5}{\text{CH}_2}} - \underset{\text{CH}_2\text{CH}_3}{\underset{4}{\text{CH}}} - \underset{\text{CH}_2}{\underset{3}{\text{CH}_2}} - \underset{\text{Cl}}{\underset{2}{\text{CH}}} - \text{COOH}$$

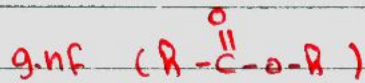
2-chloro - 4-ethyl - 6-methyl heptanoic acid

$$\bullet \text{CH}_2 = \text{CH} - \overset{\text{O}}{\parallel} \text{C} - \text{OH} \quad \text{2-Propenoic acid}$$
$$\text{CH}_2 = \underset{\text{4}}{\text{CH}} - \underset{\text{2}}{\text{CH}} - \underset{\text{1}}{\text{COOH}} \quad \text{2-chloro-3-butenoic acid}$$

OC(=O)/C=C/C(=O)/C(O)/C=O

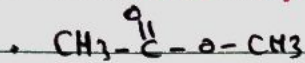
3-formyl-6-Hydroxy-7-oxo-octa-2-en-4-ynoic acid

* Esters



1 Common name

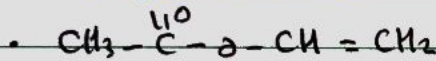
من الأسماء الشائعة للأسترات
 + اسم الحمض + ate



methyl acetate



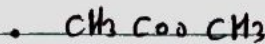
ethyl acetate



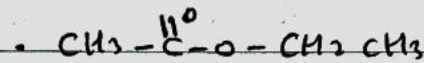
- vinyl acetate

2 IUPAC name

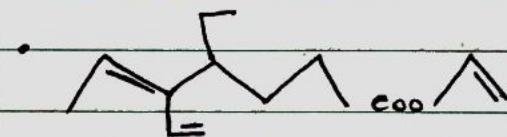
من الأسماء الشائعة للأسترات
 + اسم الحمض + oate



methyl ethanoate

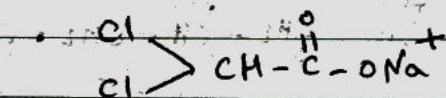


ethyl ethanoate



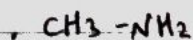
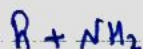
vinyl-4-ethyl-5-vinyl

hepta-5-en-1-oate

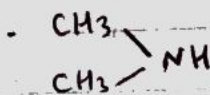
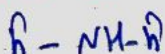


Sodium 2,2-dichloro ethanoate

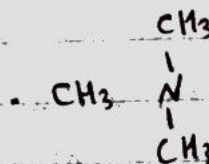
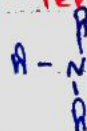
* Amines

g-n-f (R-NH₂)(NH₂)1st 1st amine

methyl amine

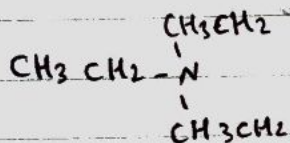
2nd 2nd amine

dimethyl amine

3rd 3rd amine

Trimethyl amine

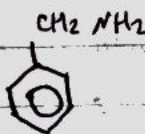
ex 1)



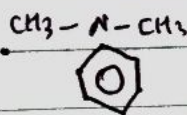
Tri ethyl amine



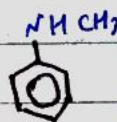
aniline



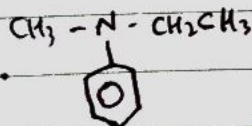
Benzyl amine



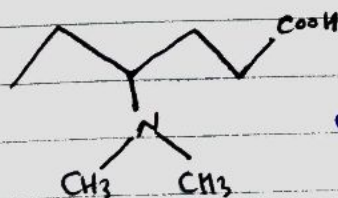
N,N dimethyl aniline



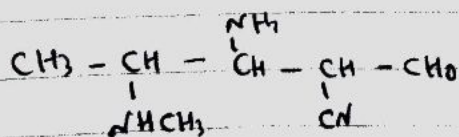
N-methyl aniline



N-ethyl-N-methyl aniline



4-(N,N-dimethyl amine) Hexanoic acid



3-amin-2-cyano

-1-Pentanal



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* hybridization

↳ it is The mixing of two atomic orbitals different in energy to form new hybrid orbitals have the same energy.

* Condition of Hybridization

- 1) center atom $\rightarrow$ الكربون (C)
- 2) no. of atomic orbitals = no. of hybrid orbitals
- 3) near energy level $(1s \quad 2s \quad 2p)$

* Steps of Hybridization:

- 1) excitation $\rightarrow$ الارتفاع
- 2) Re-orientation $\rightarrow$ ترتيب المدارات في الفراغ

* Types of orbitals

① atomic orbital.

$s \rightarrow 1 \text{ orbital} \rightarrow 2e^-$, $p \rightarrow 3 \text{ orb} \rightarrow 6e^-$, $d \rightarrow 5 \text{ orb} \rightarrow 10e^-$, $f \rightarrow 7 \rightarrow 14e^-$

② molecular orbital.

$s + s \rightarrow s-s$, $p_x + p_x \rightarrow p_x-p_x$
(axial) (head by head) (linear) (σ)

$p_y + p_y \rightarrow p_y-p_y$, $p_z + p_z \rightarrow p_z-p_z$
(lateral) (sid by side) (parallel) (π)

③ Hybrid orbital.

- | | | | |
|-----------|-----------|-----------|--------|
| 1) sp^3 | (1s + 3p) | 25% , 75% | alkane |
| 2) sp^2 | (1s + 2p) | 33% , 66% | alkene |
| 3) sp | (1s + 1p) | 50% , 50% | alkyne |

C $1s^2 \quad 2s^2 \quad 2p^2$

ground state:

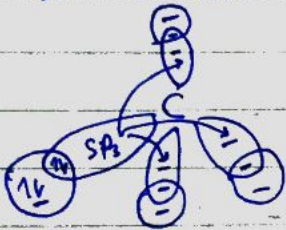
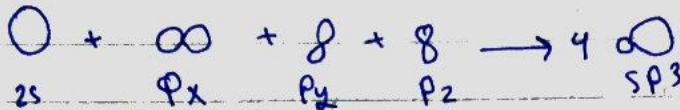
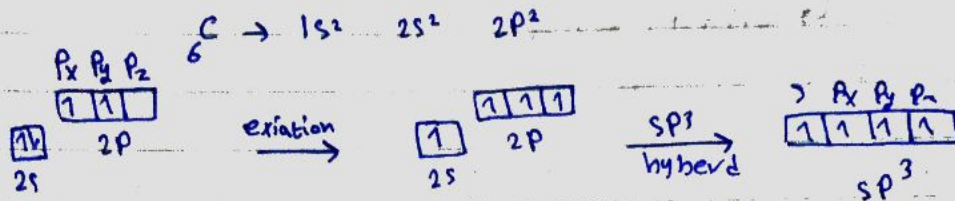
$1s^2, 2s^2, 2p_x^1$

excited state:

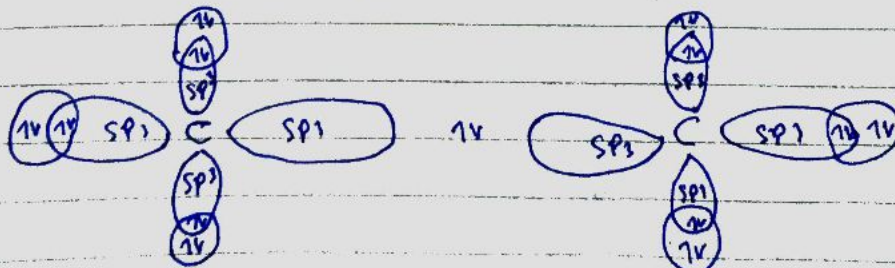
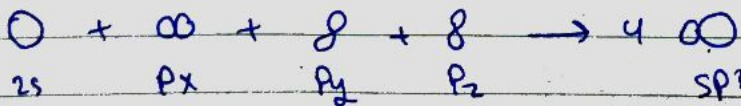
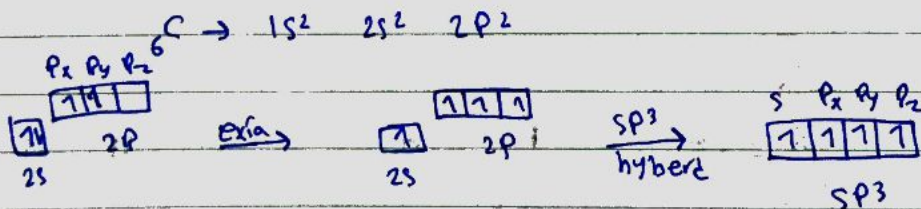
$1s^2, 2s^1, 2p_x^1$



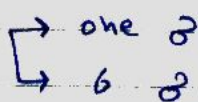
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* Alkanes sp^3 1 Methane CH_4 $(1s^2 + 3p)$ $4sp^3$ 

- Tetra hedrai

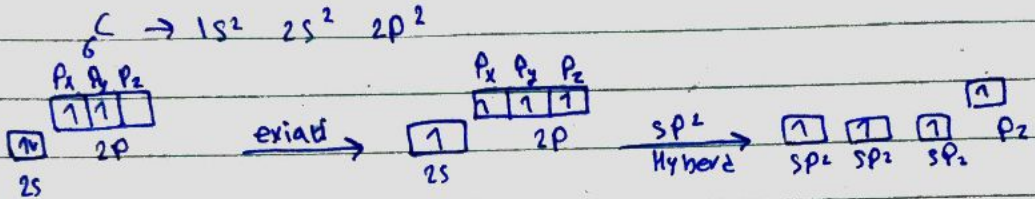
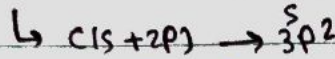
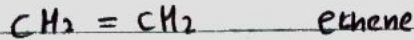
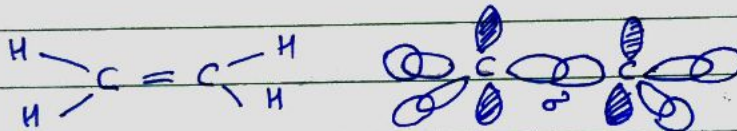
- angle 109.5° - sp^3 Hybrid- Bond length is $1.54 \text{ \AA}$ - 4 σ bond bet-en C-H2 ethane CH_3-CH_3 

- Tetra hedron structure

- angle 109.5° - sp^3 Hybrid- Bond length $1.54 \text{ \AA}$ - 7 σ bond

bet C-C

bet C-H

* Alkene sp^2  p_z not involve in Hybridization

- Trigonal Planar

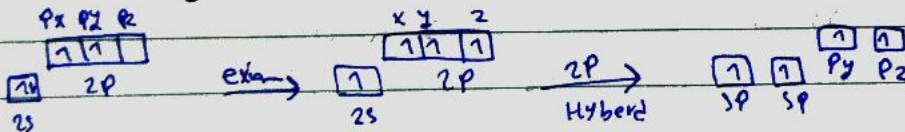
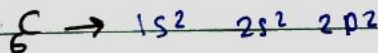
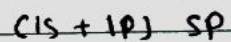
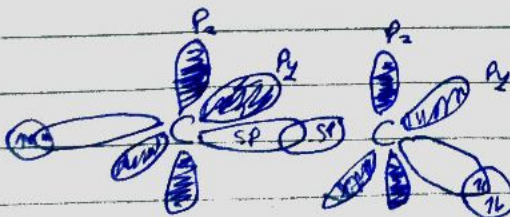
- angle = 120° - sp^2 Hybrid- 5 σ bond

$\hookrightarrow 1 \sigma$ bet C-C

$\hookrightarrow 4 \sigma$ bet C-H

- length = $1.34 \text{ \AA}$ * Alkyne sp 

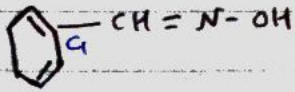
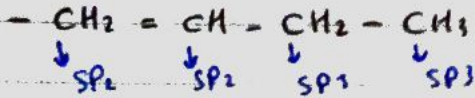
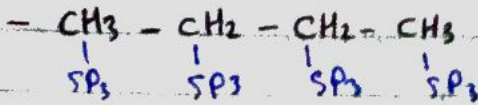
Acetylene

 p_y, p_z not involved in Hybrid $(\equiv)$ 

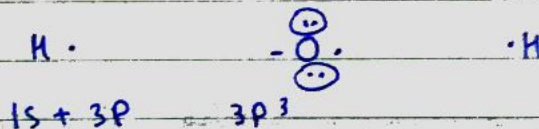
- linear

- bond length $1.2 \text{ \AA}$ - angle 180° - Type of Hybrid sp

* important


 $C_1 = 120^\circ$
(sp^2)

 $C_2 = 120^\circ$
(sp^2)

 $N = 120^\circ$
(sp^2)
- H_2O - bond that formed by axial overlap $\rightarrow \sigma$ - Percentage of s is $sp \rightarrow 50\%$ - The geometry of Alkyne $\rightarrow$ Linear- The Hybridization of linear carbon $\text{CH}_2 = \dot{C} = \text{CH}_2 \rightarrow sp$

Lec 7

* isomerism -

* المتشابهة

↳ all have the same molecular formulae but different in physical and chemical properties

لجميع المركبات لها نفس الصيغة الجزيئية ولكنها تختلف في الخواص الفيزيائية والكيميائية

• Type of isomerism :

① Structural isomerism

1] chain iso

2] Positional iso

3] functional iso

4] metamerism iso

5] tautomerism iso

② Stereo isomerism

1] geometrical iso

2] optical iso "e, x"

* Structural isomerism

• ① chain iso

لجميع المركبات لها نفس الصيغة الجزيئية ولكنها تختلف في شكل السلسلة

"تفرع" ه hea ، وفروع واصل iso ، (مستقيم) normal (CH₂)

1] CH₄H₁₀① CH₃-CH₂-CH₂-CH₃

• n-butane "

② CH₃-CH-CH₃
|
CH₃

• iso-butane "

∴ have 2 iso isomerism

2] CH₅H₁₂① CH₃-CH₂-CH₂-CH₂-CH₃

• n-Pentane "

② CH₃-CH-CH₂-CH₃
|
CH₃

• iso-Pentane "

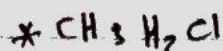
③ CH₃-C-CH₃
|
CH₃

• neo-Pentane "

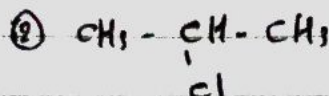
∴ have 3 iso isomerism

② Positional iso -

مركبات لها الصيغة الجزيئية وتختلف في مكان المجموعة الفاعلة



• 1-chloro Propane

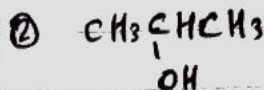


• 2-chloro Propane

② isomeric

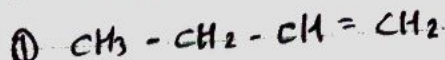


• 1-Propanol

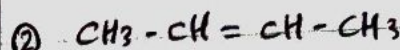


• 2-Propanol

2 isomers



• 1-Butene



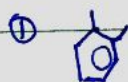
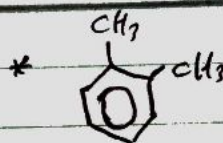
• 2-Butene



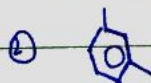
• 1-Butyne



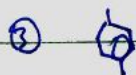
• 2-butyne



o-xylene



m-xylene



p-xylene