ejercicios tema 1.

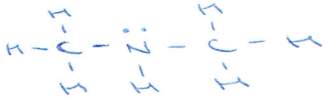
1. Estructuras Lewis

a) HCO_2H

N = 28 D = 18 C = 10 (5 pares)

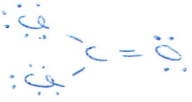
b) $(CH_3)_2NH$

N = 38 D = 20 C = 18 (9 pares)



c) Cl_2CO

N = 32 D = 24 C = 8 (4 pares)



d) $NH_4^+ Cl^-$

e) NC^-

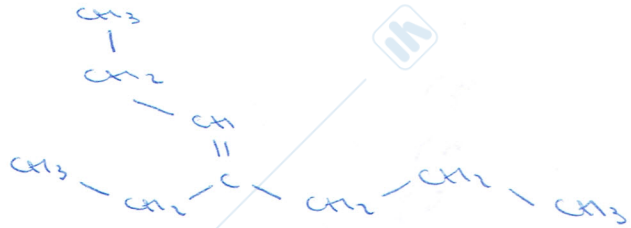
N = 16 D = 10

C = 6 (3 pares)

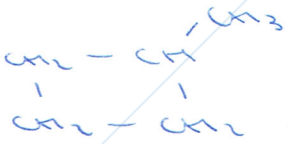
2. Representa las fórmulas expandidas

a)

b)



c)

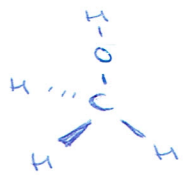


3. Representación tridimensional

a) CCl_4

(tetraedro)

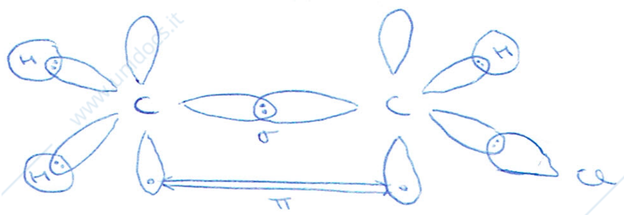
b) CH_3OH



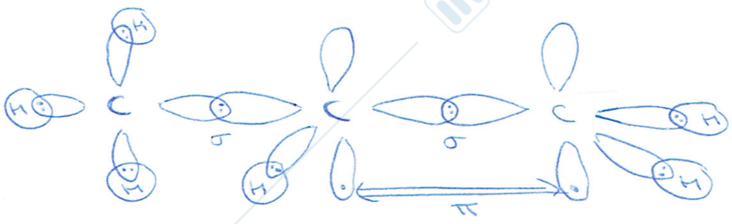
c) $CHCl_3$

4. Representación tridimensional

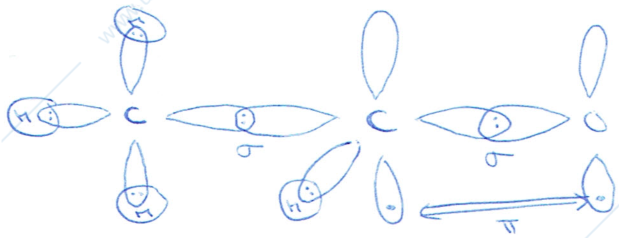
a) $CH_2=CHCl$



b) $CH_3CH=CH_2$



5. Enlaces σ de CH_3COH



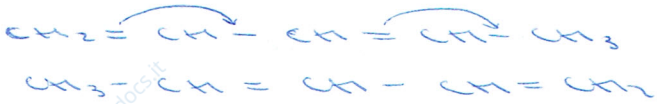
6. Grupos funcionales

a) Aldehído
b) Alcohol
c) Alquino (triple enlace)
d) Amina
e) ~~Éster~~
f)
g) Alqueno
h) Éter
i) Ácido carboxílico

7. Isómeros C_6H_{14}

1. $CH_3-CH_2-CH_2-CH_2-CH_2-CH_3$ (hexano)
2. $CH_3-CH(CH_3)-CH_2-CH_2-CH_3$ (2-metilpentano)
3. $CH_3-CH(CH_2-CH_3)-CH_2-CH_3$ (2-etilbutano)
4. $CH_3-CH(CH_3)-CH(CH_3)-CH_3$ (2,3-dimetilbutano)
5. $CH_3-CH_2-CH(CH_3)-CH_2-CH_3$ (3-metilpentano)
6. $CH_3-C(CH_3)_2-CH_2-CH_3$ (2,2-dimetilbutano)

8. Formas resonantes 1,3 - pentadieno



---

1. Si son resonantes indican el mov. de electrones

a) 

b) No son resonantes

c) 

d) 

e) 

f) No son resonantes

g) 

h) No son resonantes

i) No son resonantes (son isómeros)

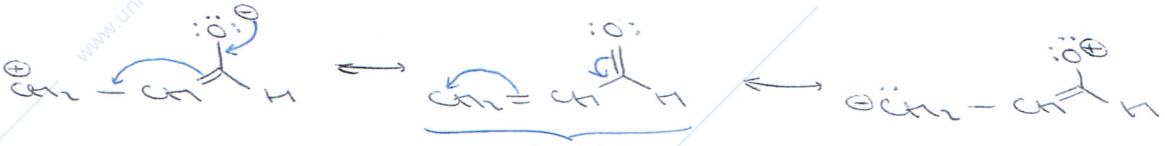
2. Mov. de electrones + estructura con más estabilidad

a) 

1ª + estable

b) 

2ª + estable (carga - en el + electronegativo)

c) 

+estable

d) 

+ estable (carga + en el menos electronegativo)

e) 

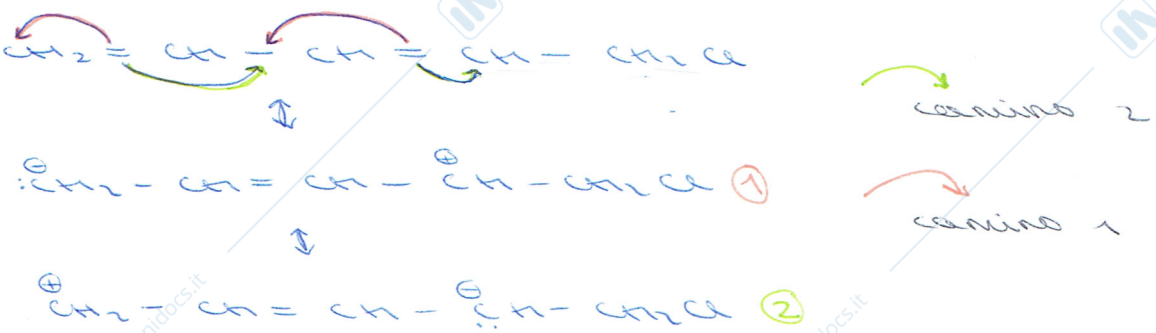
+ estable (carga - en el mas electronegativo)

3. Formulat las estructuras resonantes

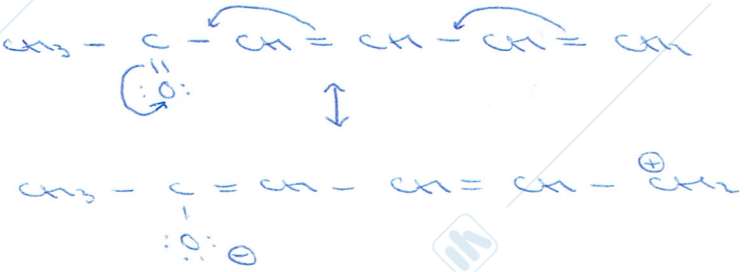
a) Metoxieteno

b) 2-butenal

c) 5-cloro-1,3-pentadieno

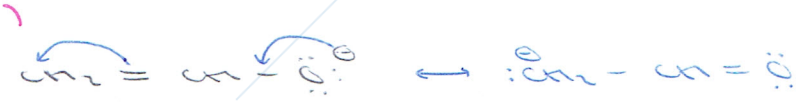


d) 3,5-hexadien-2-ona

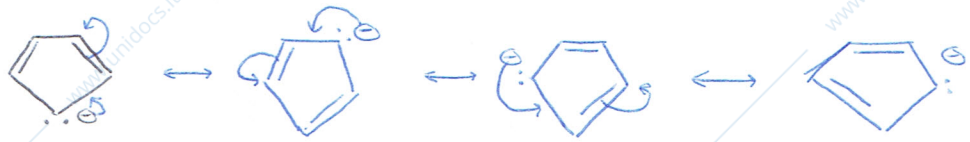


4. Estructuras resonantes

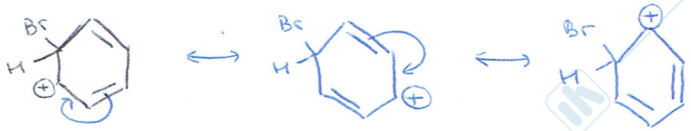
a)



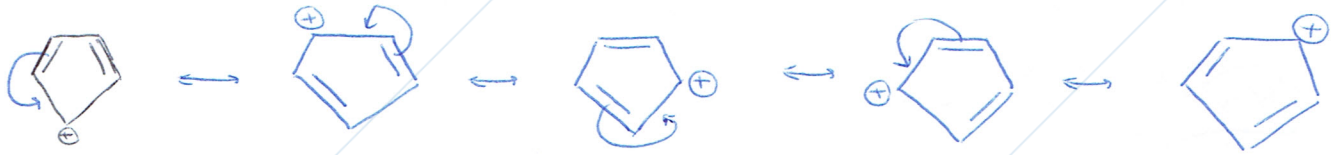
b)



c)



d)



e)

5. Ordenar por estabilidad y clasificar

$(CH_3)_2CHCH_2CH_2^+$ → primario

$CH_3CH^+CH(CH_3)_2$ → secundario

$CH_3C^+(CH_3)CH_2CH_3$ → terciario

estabilidad ↓ (− arriba, + abajo)

6. Estabilidad cationes: etilo, bencilo, fenilo, terc-butilo

etilo → $CH_3-CH_2^+$

fenilo → 

bencilo →  CH_2^+

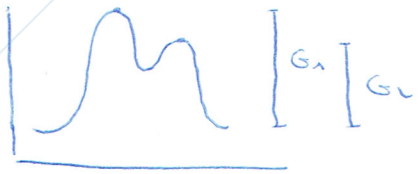
terc-butilo → $CH_3-C^+(CH_3)_2$

Estabilidad → bencilo > terc-butilo > etilo > fenilo

↓ efecto resonante

7. $(C_6H_5)_2CHCl \longrightarrow (C_6H_5)_2CH^+ \xrightarrow{OH^-} (C_6H_5)_2CHOH$

$G_1 > G_2$ Diagrama energético



a) Mecanismo unimolecular

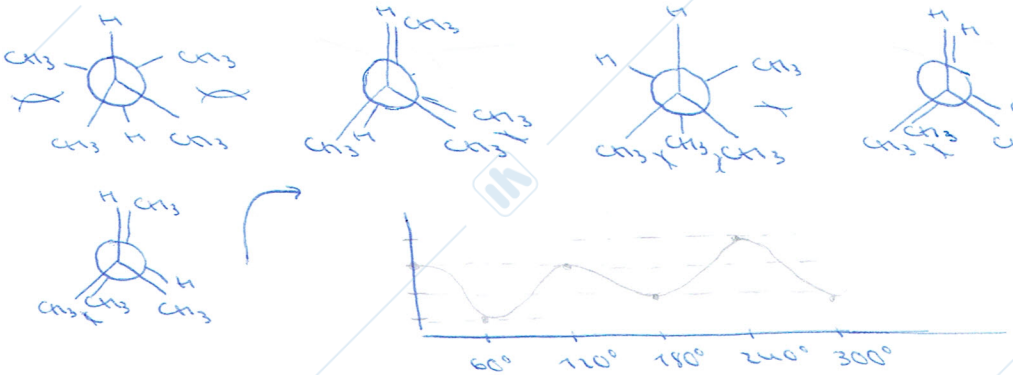
Etapa 1 → solo un reactivo (interviene una única molécula)

b) Etapa limitante → 1, porque es la que más tarda en producirse

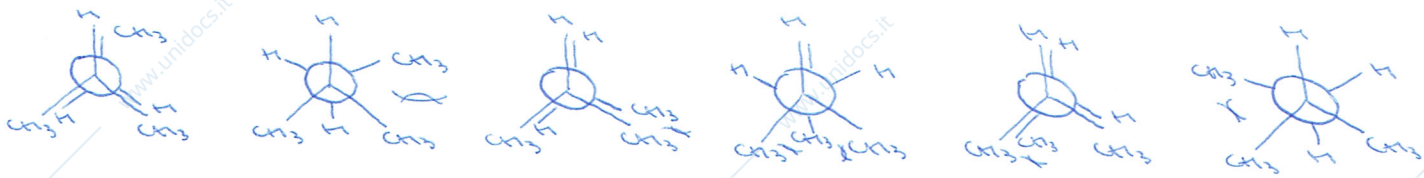
ejercicios tema 2

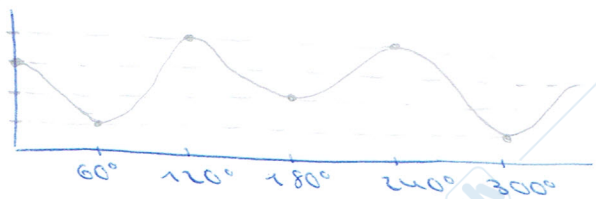
1. Rotación + curva energía

a) $(CH_3)_2CH-CH(CH_3)_2$

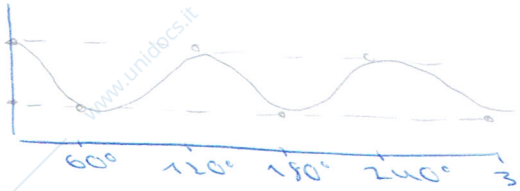


b) $(CH_3)_2CH-CH_2CH_3$

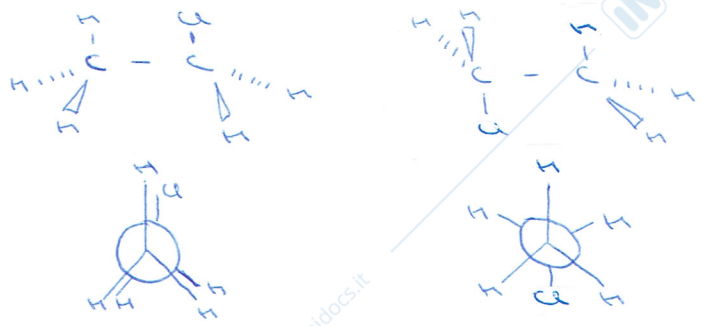




c) $(CH_3)_3C-C(CH_3)_3$

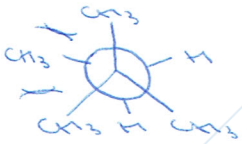


2. Ciclopentano → respectiva y proyecciones de Newman

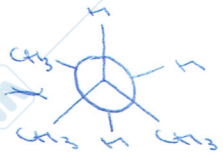


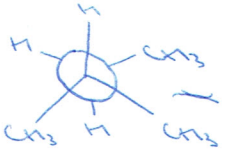
3. Enlace C_2-C_3 → proyección Newman

a) 2,2-dimetilbutano → + estable

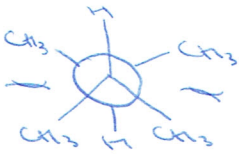


b) 2-metilbutano → 2+ estables



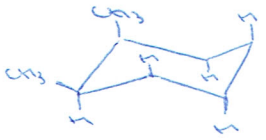


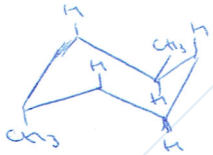
c) 2,3-dimetilbutano → 2+ estables



4. Relación entre

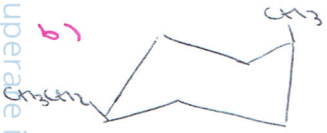
a) cis-1,2-dimetilciclohexano y trans-1,3-dimetilciclohexano

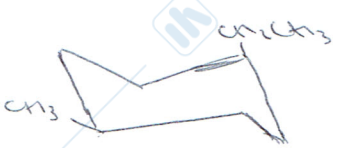




son isómeros de posición

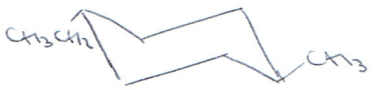
b)





silla-silla invertida (isomería conformacional)
cada grupo axial ha pasado a ecuatorial y viceversa

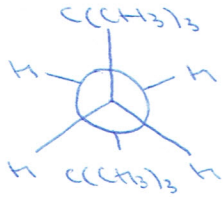
c)



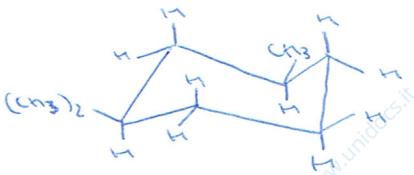
isomería geométrica
1º → cis 2º → trans

5. Conformación más estable

a) 2,2,5,5-tetrametilhexano (enlace C_3-C_4)

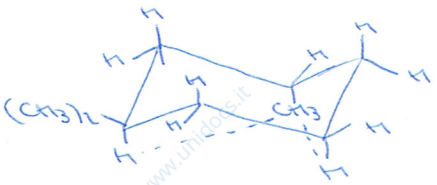


b) cis-1-isopropil-3-metilciclohexano



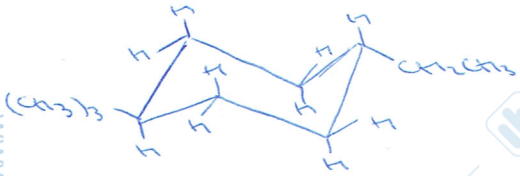
ecuatorial + estable

c) trans-1-isopropil-3-metilciclohexano

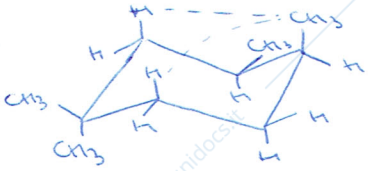


mejor CH_3 en axial, ya que $(CH_3)_2$ interacciona más que CH_3

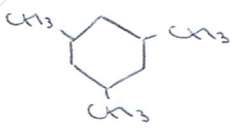
d) cis-1-terbutil-4-etilciclohexano



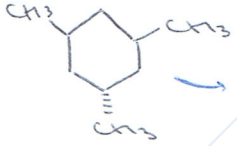
e) cis-1,1,3,4-tetrametilciclohexano



6. 1,3,5-trimetilciclohexano + estable?

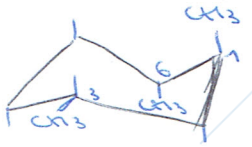


+ interacciones



→ habrá menos repulsiones

7. Dibuja



a) CH_3 en C6 por debajo → axial

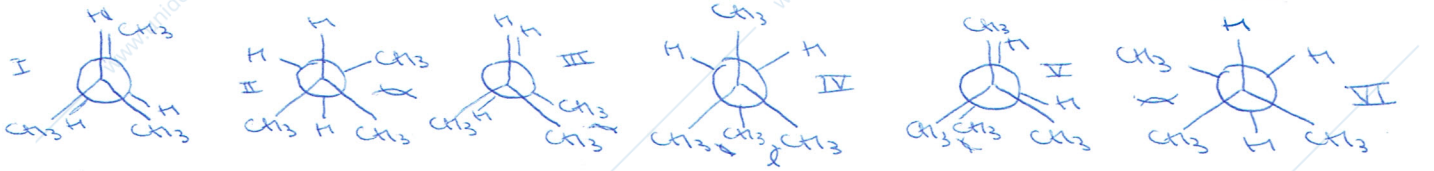
b) CH_3 en C1 por encima. + o - estable que un CH_3 por encima en C4?
menos, porque en C4 sería ecuatorial

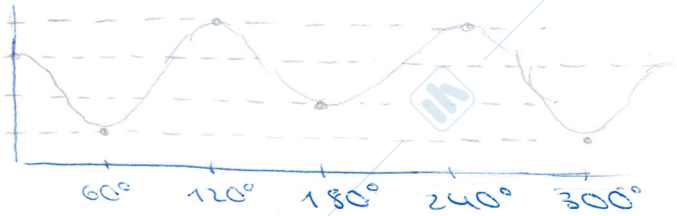
c) Metilo en C3 en la posición más estable
por debajo → ecuatorial

II

1. 2-metilbutano (C2-C3)

$CH_3 - CH(CH_3) - CH_2 - CH_3$



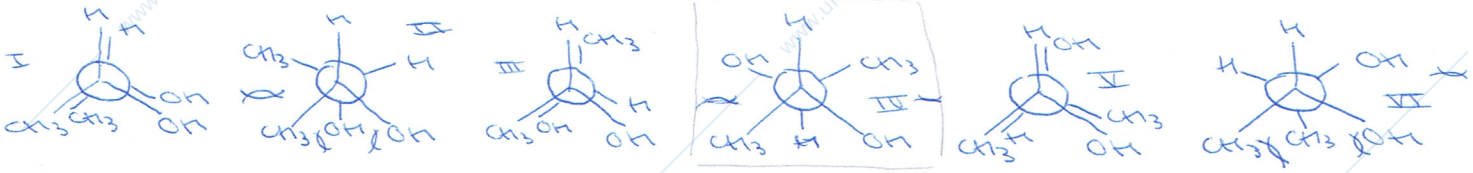


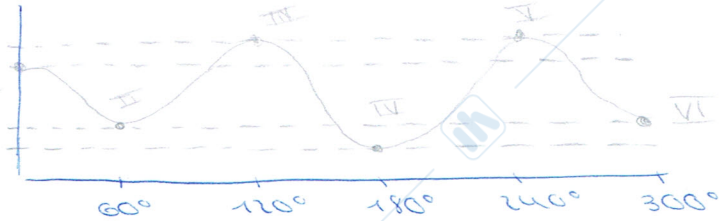
Eclipsadas → repulsiones electrónicas

Alternadas → impedimentos estéricos

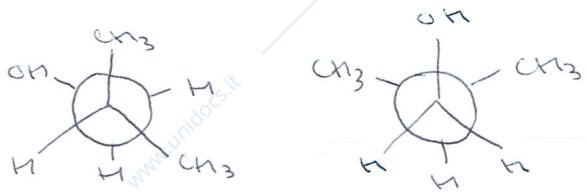
2. 2,3-butanodiol

$CH_3 - CH(OH) - CH(OH) - CH_3$





3. Relación

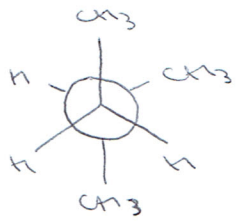


son idénticas moléculas

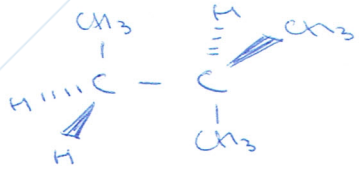
Distintas conformaciones (alternadas)

4. Nombrar, pasar a perspectiva

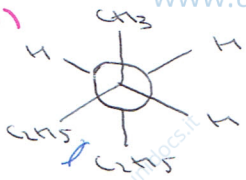
a)

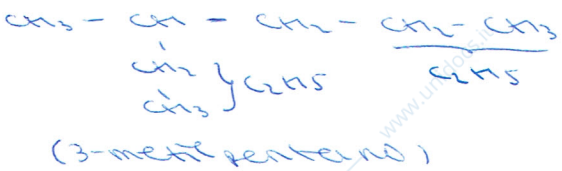


$CH_3 - CH_2 - CH(CH_3) - CH_3$ 2-metilbutano

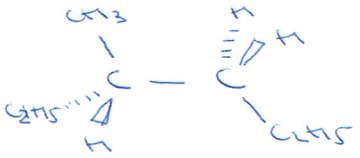


b)





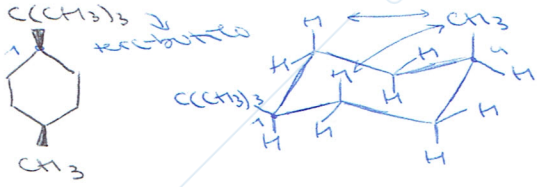
(3-metilpentano)



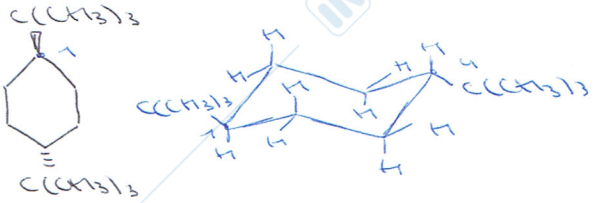
No es la más estable, ya que hay impedimentos estéricos entre 2 grupos etilo, que son mayores que entre etilo y metilo

5. conformación más estable

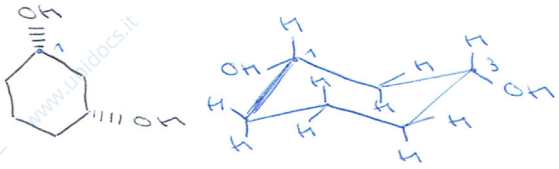
a)



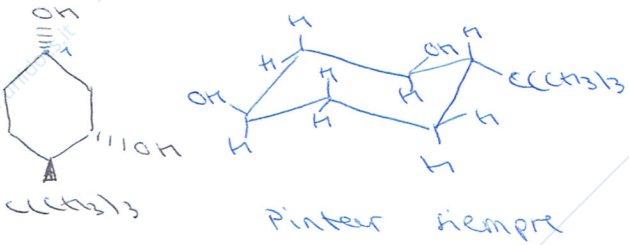
b)



c)



d)



Pinter siempre las 2 !!

6. comparar estabilidad

a) cis y trans - 2 - metilciclohexanol

b) cis y trans - 3 - metilciclohexanol

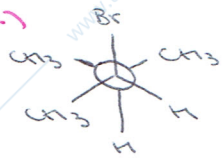
cis

trans

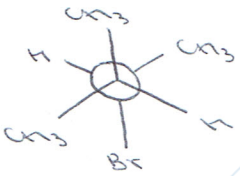
ejercicios tema 3

1. diferentes compuestos?

a)



2S



2R

son el mismo compuesto → 2 conformaciones alternadas distintas (habría que pasarlo a forma 3D)

son enantiómeros

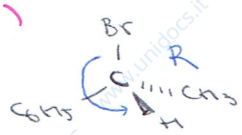
b)

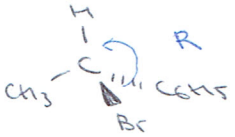
2R3S

2R3S

son el mismo diastereoisómero } forma meso

c)

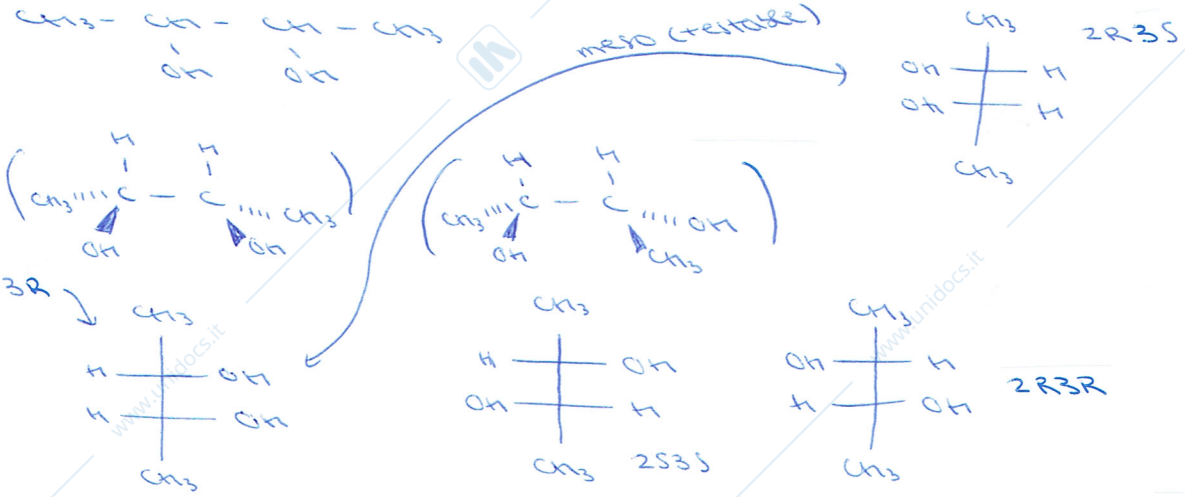




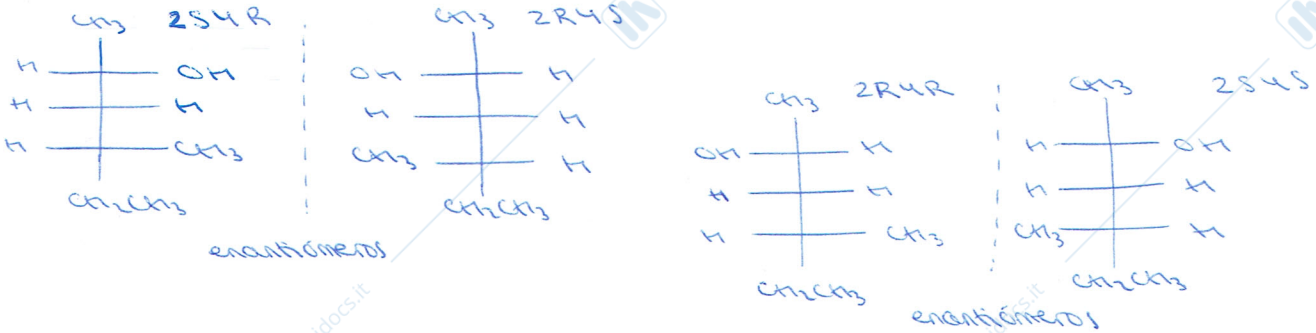
son el mismo estereoisómero

2. 2,3-butanodiol → 2 conf. diastereoisómeras (+estable).

R o S? proyecciones de Fisher

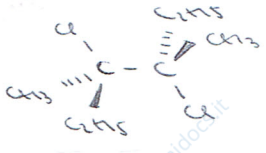


4. 4 estereoisómeros del 4-metil-2-hexanol

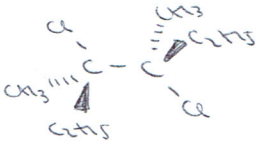


2S4R y 2R4R
2R4S y 2R4R
2S4R y 2S4S
2R4S y 2S4S
} diastereoisómeros

3.



3R4S (forma meso)



3R4R

3S4R (forma meso)

3.R4R

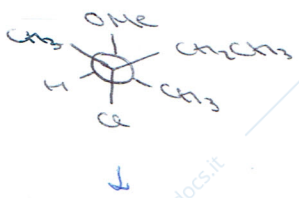
a) ¿son idénticos? 2 y 4 sí (meso)

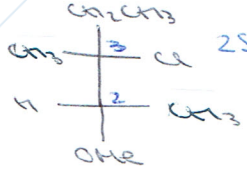
b) Enantiómeros 1 y 3 → 1 y 3 sí (meso)

c) Diastereoisómeros 1 y 2, 1 y 4, 3 y 2, 3 y 4

d) Ópticamente activos? Forma meso no

5. Relación



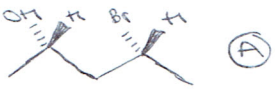


2S3S

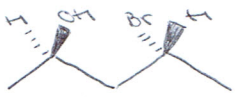
son el mismo estereoisómero

2S3S

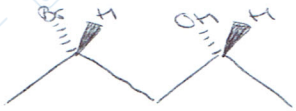
6. Relación de A con los demás



A 2S4R

a) 

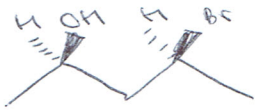
2R4R

b) 

2R4S

c) 

2S4R

d) 

2R4S

A y a son diastereoisómeros

A y b son enantiómeros

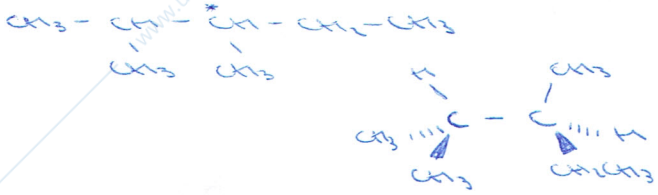
A y c son el mismo estereoisómero

A y d son enantiómeros

1. Representa:

a) (R) 1-bromo-1-cloroetano

b) (S) 2,3-dimetilpentano

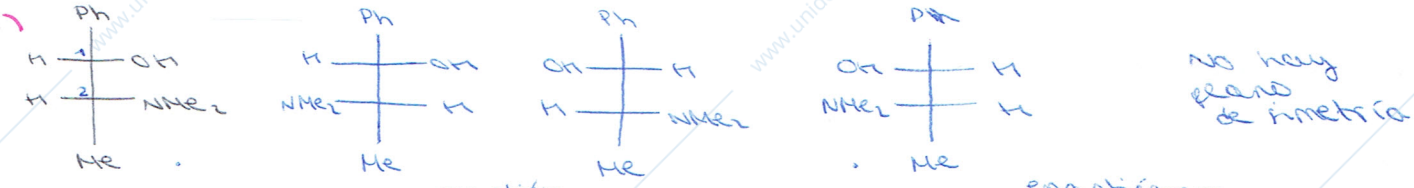


c) (S) 1-cloro-1-propanol

d) (R) 2-butanol

4. Indica R/S y dibuja los diastereoisómeros para cada uno

a)

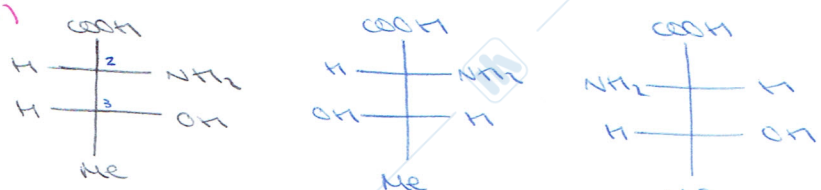


1S2R

1S2S ⟷ (enantióm.) 1R2R

1R2S (enantiómero con el 1º) — No hay plano de simetría

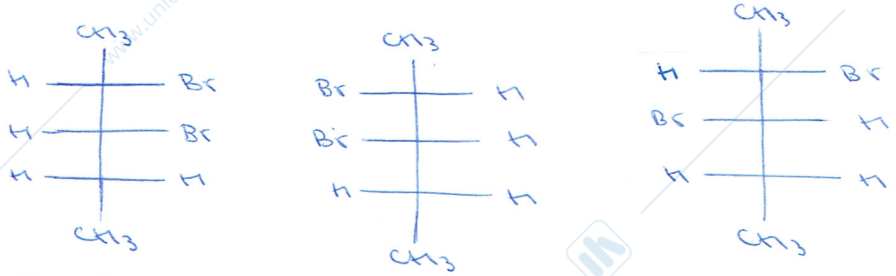
b)



2R3R

2R3S ⟷ (enantióm.) 2S3R

5. (2S,3S)-2,3-dibromopentano en Fischer. Dibuja un enantiómero y uno diastereoisómero.



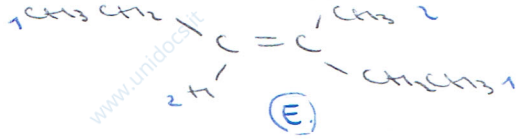
2S3S

2R3R (enantiómero)

2S3R (diastereoisómero)

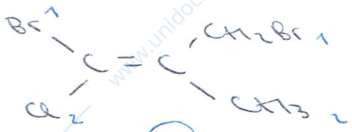
6. Configurazioni

a)



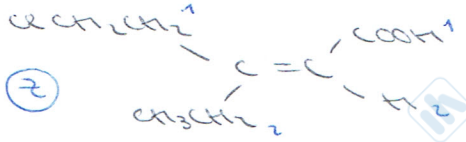
(E)

b)



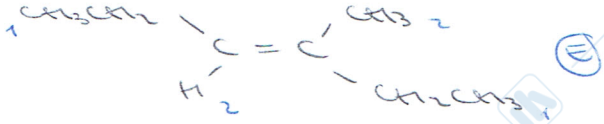
(Z)

c)



(Z)

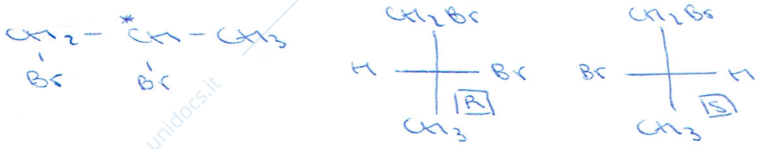
d)



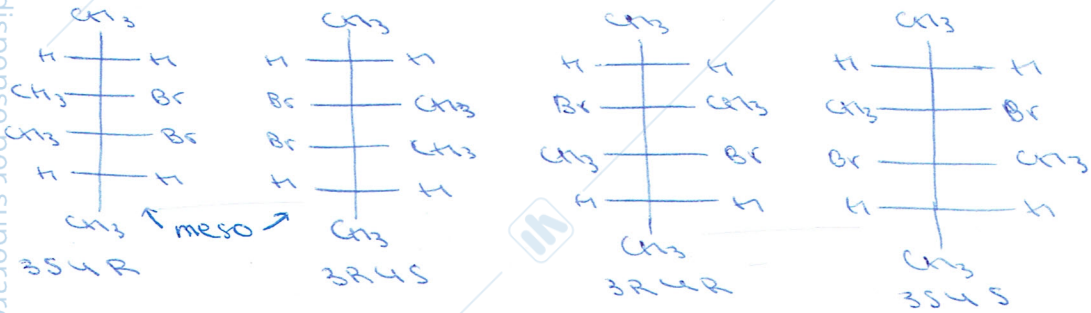
(E)

3. Stereoisomeri

a) 1,2- dibromopropano



b) 3,4- dibromo -3,4- dimetilesano



c) 2,3,4- tribromoesano