Organic Chemistry EXAM

Second -2

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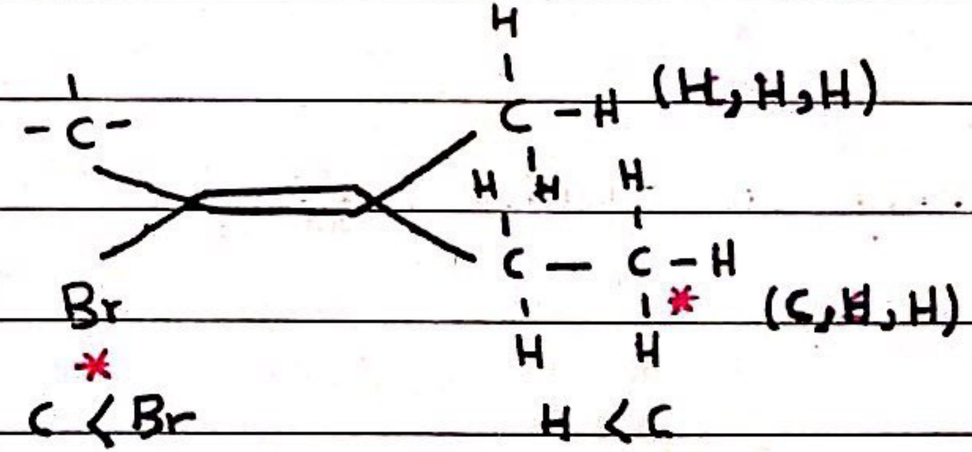
midterm exam II (answers).

I.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	C	B	B	B	B	A	D	C	A	C	B	B	C	B

* Solutions:

1. Which is Z- configuration?



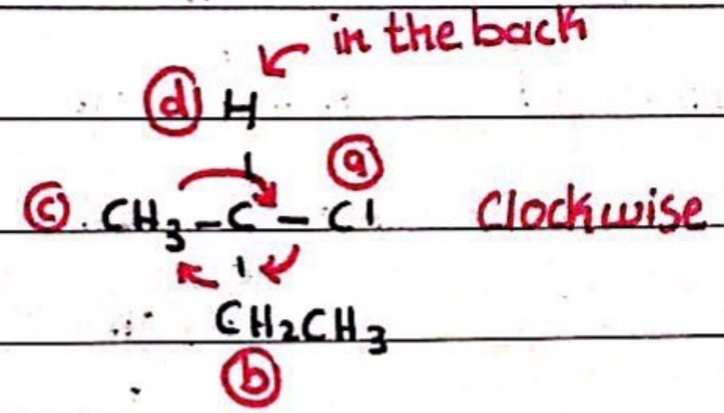
2. Which is NOT true?

* Enantiomers differ in 1) Chemical reactivity toward Chiral reagents.
2) Sign of specific rotation.
1) + 2) are Chiral properties.

3. α = zero , the sample is: The sample could be a ① meso compound - meso compounds are Achirals - and a ② racemic mixture.

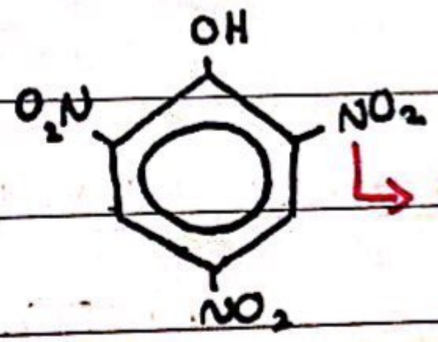
Optically inactive

1. R - 2- Chlorobutane :



Chem-is-try ♡

. Strongest acid ?



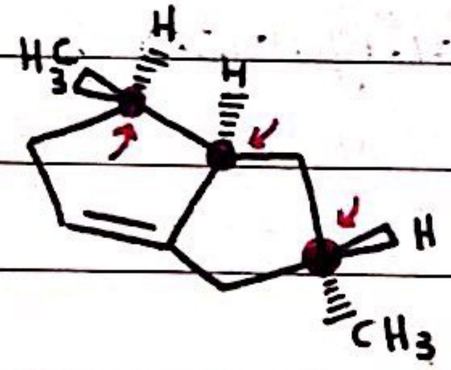
↳ Strongly electronegative. "e- withdrawing"

* Phenol is a much stronger acid than ethanol, because phenoxide ions are stabilized by resonance.
* All electron withdrawing groups increase acidity by stabilizing the conjugate base. "Inductive effect"

6. Which is the strongest Nu ? CH_3S^-

* negative ions are more nucleophilic than the corresponding neutral molecules.
* Elements low in the periodic table tend to be more nucleophilic than elements above in the same ■ column.

7. How many stereogenic centers?



three.

8. $[\alpha] = ?$ if : $C = \frac{2\,g}{100\,mL}$ $l = 2\,dcm$ $\alpha = +2.4°$

$$[\alpha] = \frac{\alpha}{C \cdot L} = \frac{+2.4}{0.02 \times 2} \times \frac{0.6}{5} \times 100 = +60$$

9. Slowest step?

Slowest step= RDS * formation of the carbocation.

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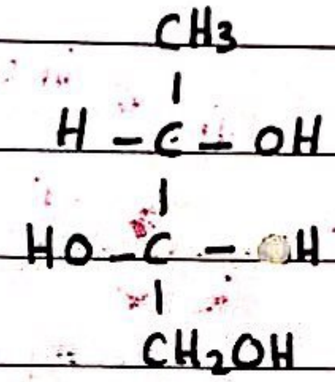
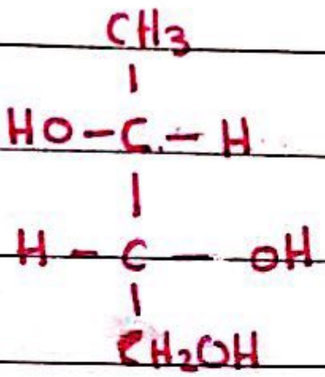
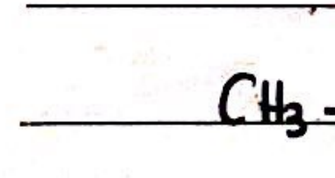
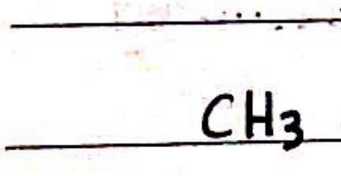
10. Which is an enantiomer of  ?  (c)

mirror images.

11. Polar AProtic solvent? * Polar protic: solvents that donate Protons. e.g: HO–H, RO–H



* Aprotic solvents has no O–H or N–H bonds.



"If you're not apart of the solution, you're part of the Precipitate." ☺

12. Identify the leaving group? I.

13. Which reaction proceeds with inversion? SN1 → Racemization.
SN2 → inversion.

14. You need to convert $CH_2(Cl)-CH_2CH_2-CH_3$ to $CH_2=CH_2CH_2CH_3$
alkyl halide : alkene.
↳ Elimination ↑

* The substrate is a Primary halide; only SN2 and E2 are possible
Only with very BULKY STRONGLY basic nucleophiles E2 process is favored.

15. Which alkyl halide undergoes SN1 most rapidly?
Step one which is RDS ↵
is the formation of the carbocation. ⇒ $3° > 2° > 1°$
*

16. Which has the highest Boiling Point? $CH_3CH_2CH_2-O-H$

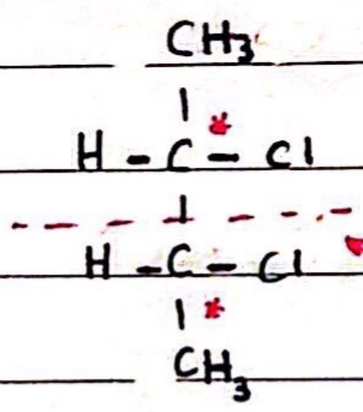
the Presence of H-bonds between molecules.

II) 2,3- dichlorobutane. (optically inactive)

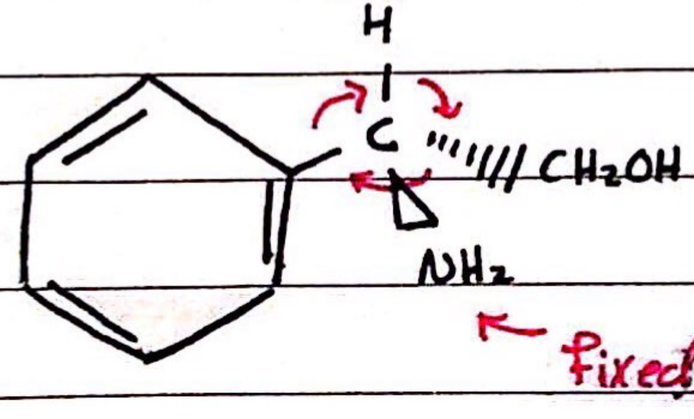
↙ ↘

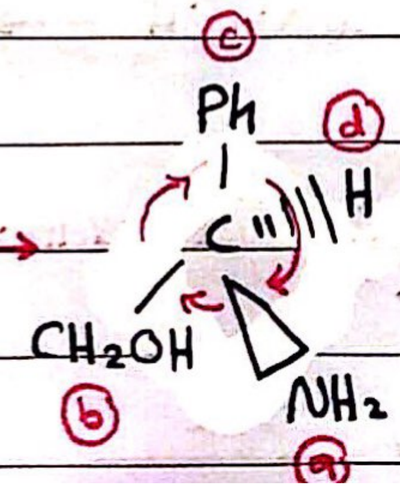
Meso compound ✓ (Achiral, but with at least two Chiral centers).

Achiral. with no stereogenic center. ✗



III)



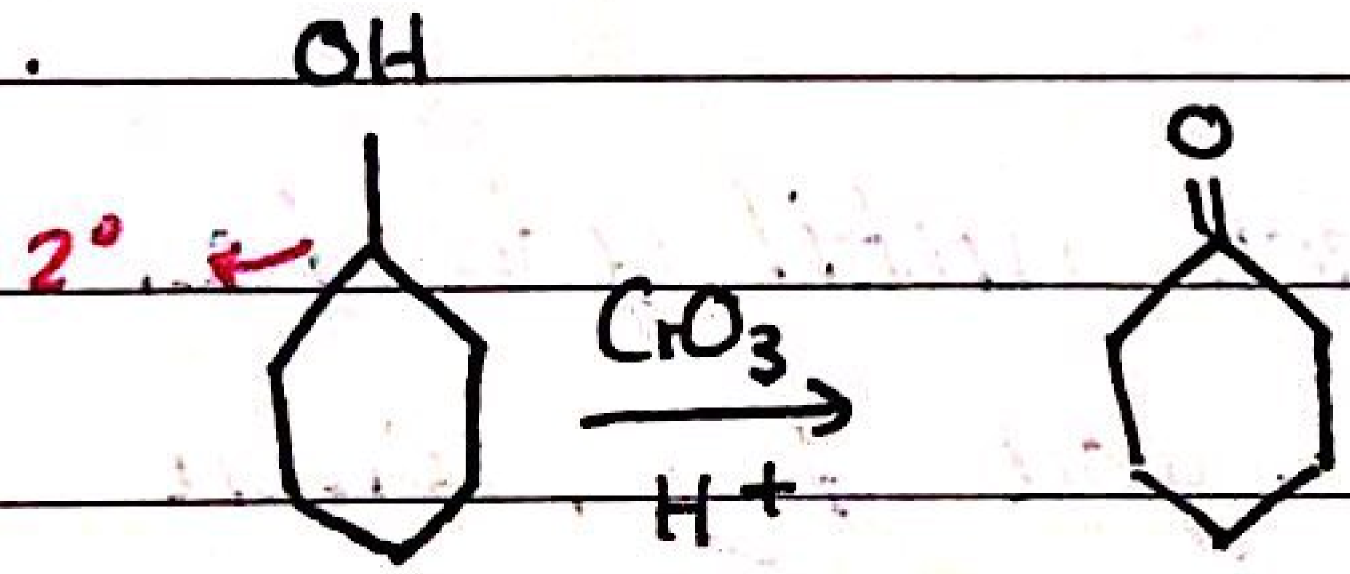


Dilute your sorrow
evaporate your worries
filter your mistake
and boil your ego.

v) 1. $CH_3CH_2CH_2CH_2OH \xrightarrow{SOCl_2} CH_3CH_2CH_2CH_2Cl + SO_2\uparrow + HCl\uparrow$

2. $CH_3CH_2CH_2CH_2SH \xrightarrow{NaOH} CH_3CH_2CH_2CH_2S^-Na^+ + H_2O$

3.



cyclohexanone.

4. $CH_3CH_2CH_2CH_2OH \xrightarrow[CH_2Cl_2\ 25^\circ C]{PCC} CH_3CH_2CH_2\overset{\overset{O}{\parallel}}{C}-H$

ionic

5. $CH_3\underset{|}{\overset{CH_3}{\overset{|}{C}}}HCH_2CH_2Br \xrightarrow[DMSO]{CH_3CH_2SNa} CH_3\underset{\underset{CH_3}{|}}{C}HCH_2CH_2SCH_2CH_3$ + $CH_3\underset{\underset{CH_3}{|}}{C}HCH=CH_2$

3° 1°

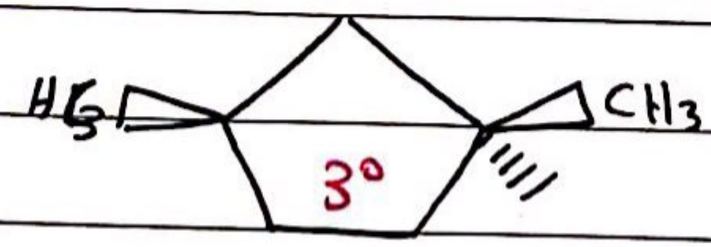
SN1

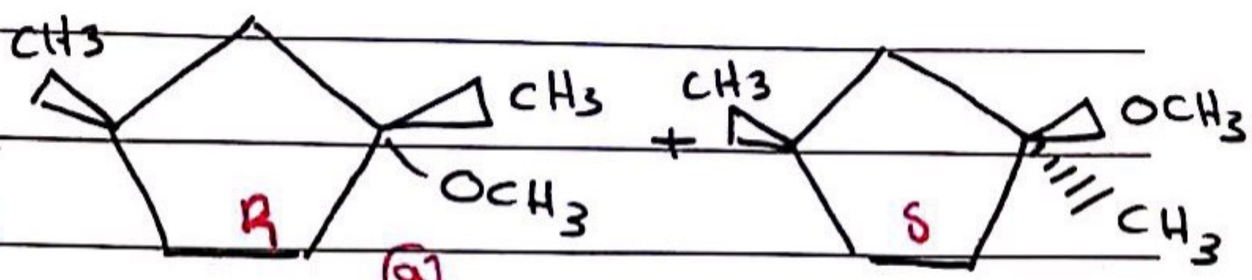
"Think like a proton and stay Positive +"

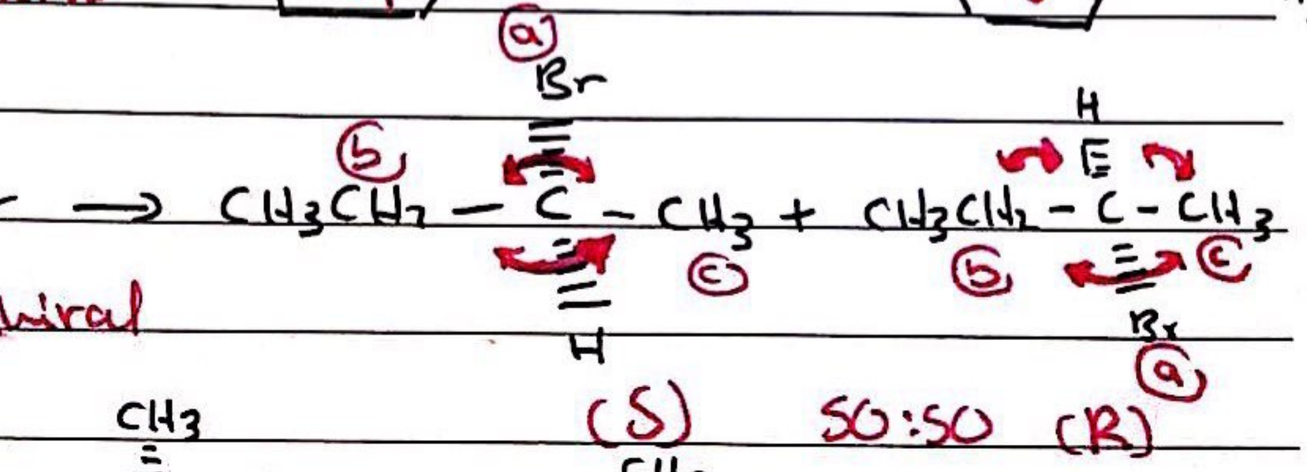
6. $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-Br + {}^-OH \rightarrow CH_3-\underset{\underset{CH_3}{|}}{C}=CH_2$

3° ionic E1 E2

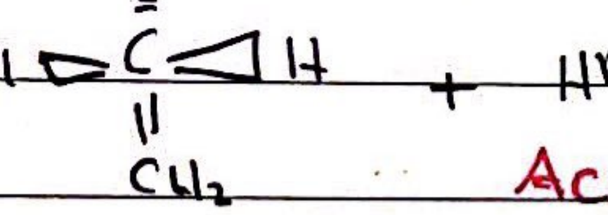
IU)

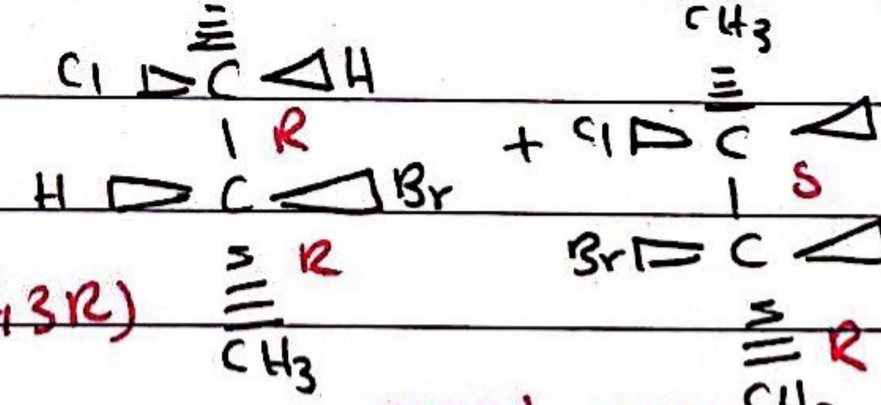
1) 

CH_3OH (covalent) →


2) $CH_3CH_2CH=CH_2 + HBr \longrightarrow$ 

Achiral Achiral

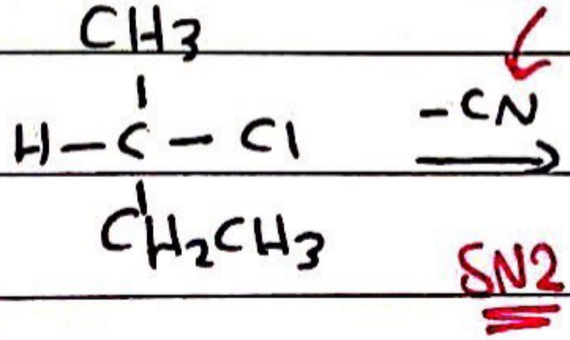
3) 

+ HBr → 

Chiral Achiral (2R,3R) (2S,3R)

Diastereomers

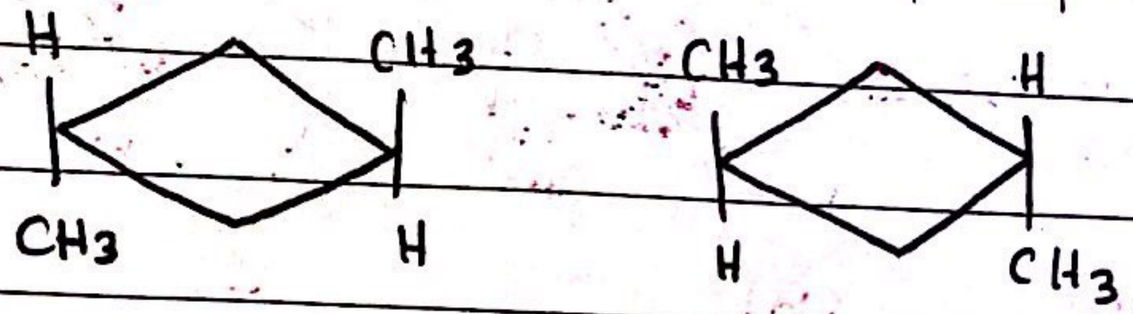
ionic



SN2

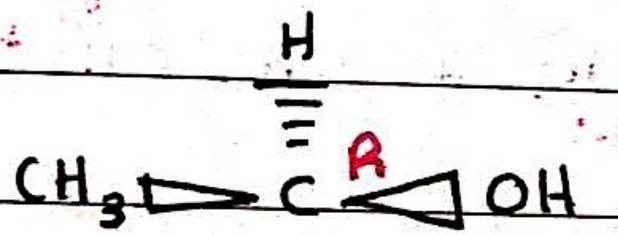
(S) (R)

VII)

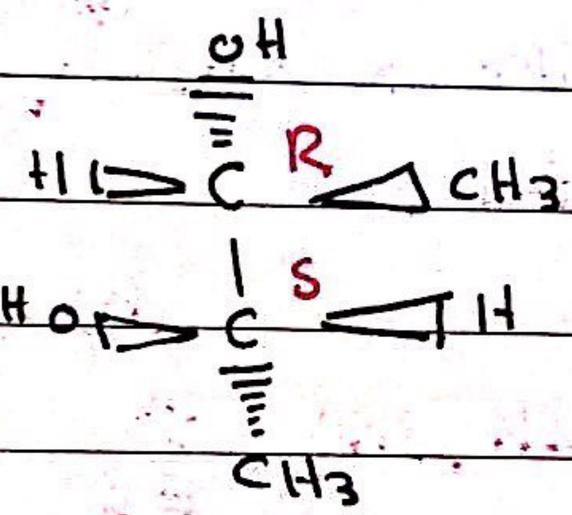


Enantiomers

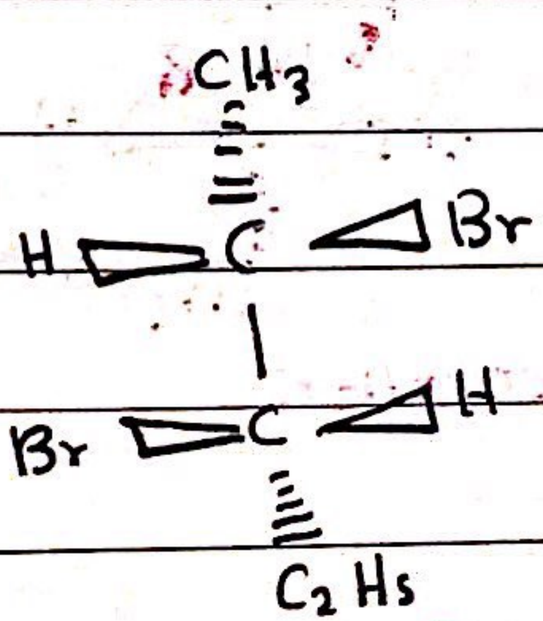
trans

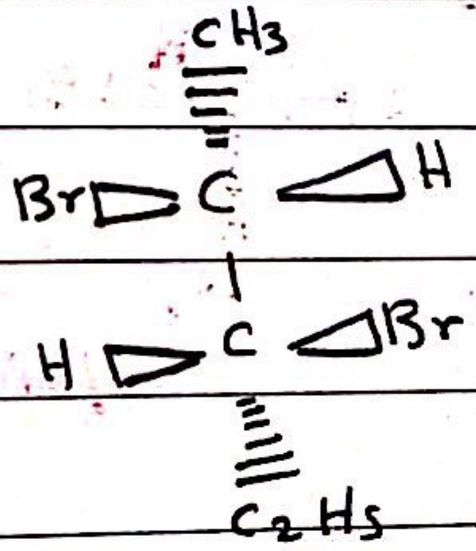


trans



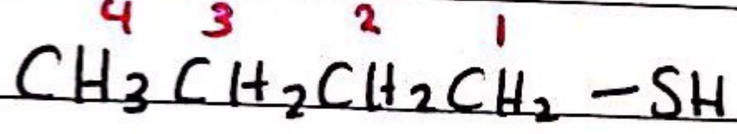
Diastereomers



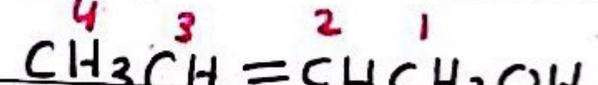


Enantiomers

VII) Name the following compounds.



1-butanethiol.



2-buten-1-ol

Good luck :)

Hadeel Abdullah.

Corrected by:
Anwaar Abdullah.

"It's not until you fall that you fly, When your dreams come alive you're unstoppable, take a shot, Chase the sun, Find the beautiful :)".