LEC (10) CHEM 30A Apr 25th

(1) R/S DESIGNATION
(2) FISCHER PROJECTIONS
(3) CIS/TRANS DIASTEREOISOMERS

PROBLEMS: 3.4-3.7, 3.24-3.32 (3rd)
3.4-3.8, 3.25-3.33 (4th)
READ: 3.4-3.5 (4th) & (3rd)

MIDTERM: ROOMS A-H ROYCE 190 I-Z CS50
ID, MODEL KITS

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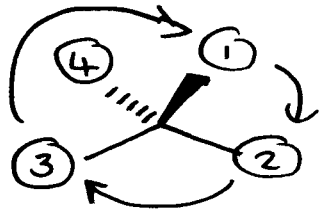
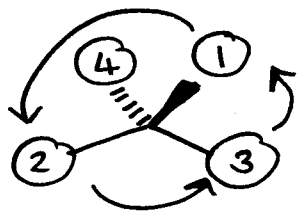
(1) R/S DESIGNATION

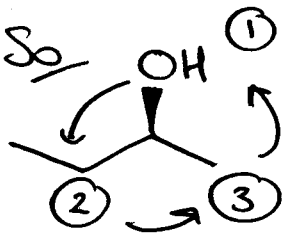


CLOCKWISE (R)

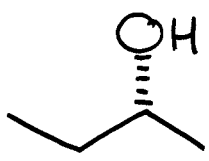


COUNTERCLOCKWISE (S)

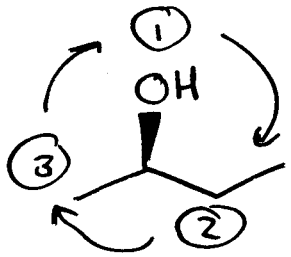
So



(S)-2-BUTANOL



rotate 180°

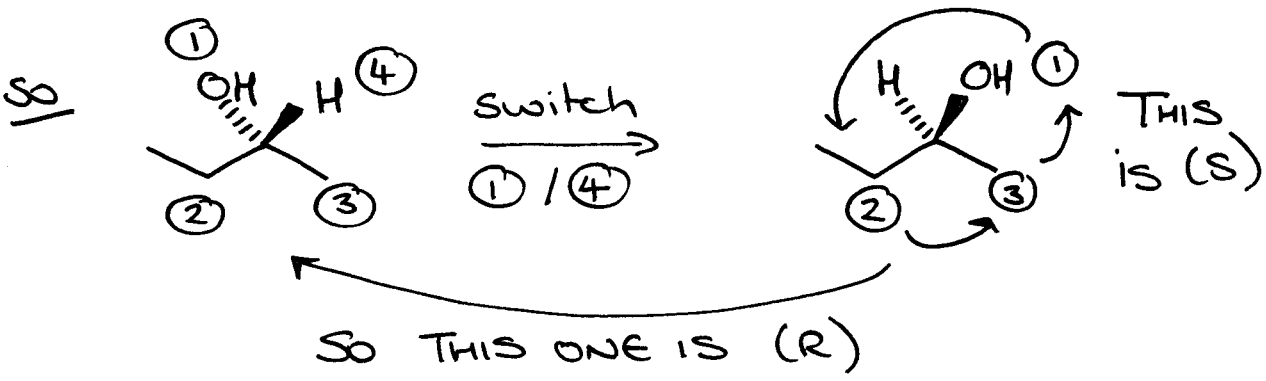


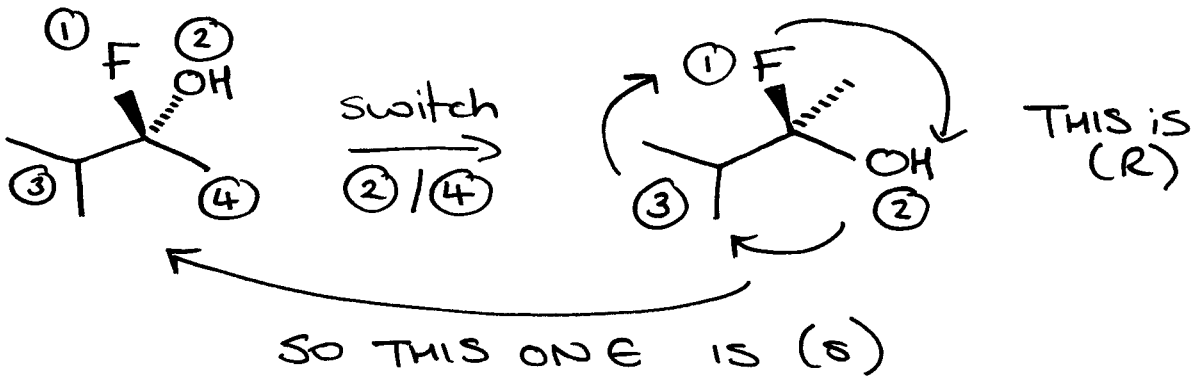
(R)-2-BUTANOL

Small group is NOT in the back

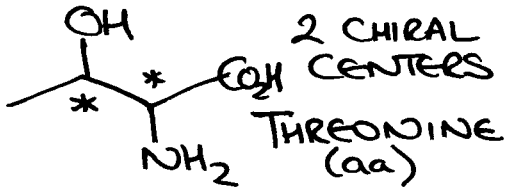
or if you have trouble rotating molecules

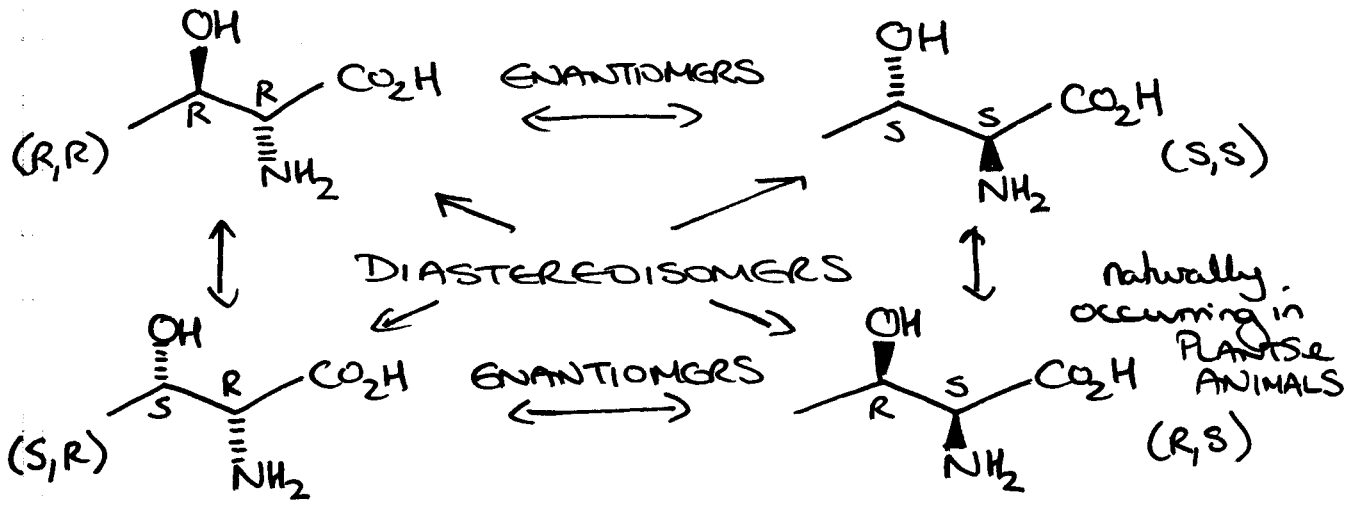
- SWITCH lowest priority group (4) with the group that is in the back
- ASSIGN R/S, and switch





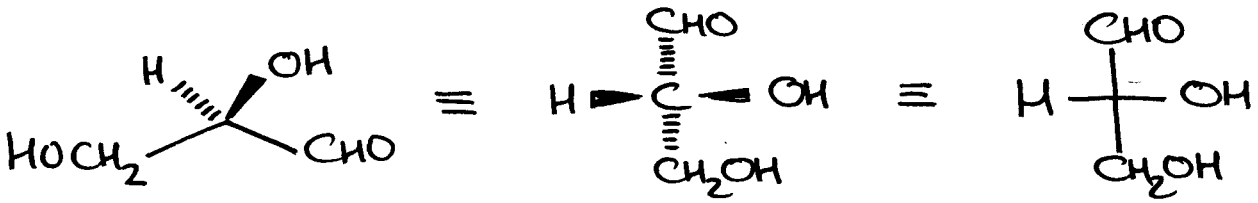
Compounds with more than one STEREOCENTER





DIASTEREOISOMERS – non mirror image STEREOISOMERS

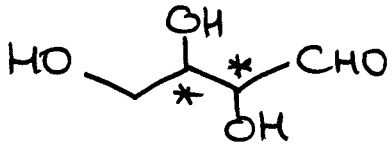
② FISCHER PROJECTIONS

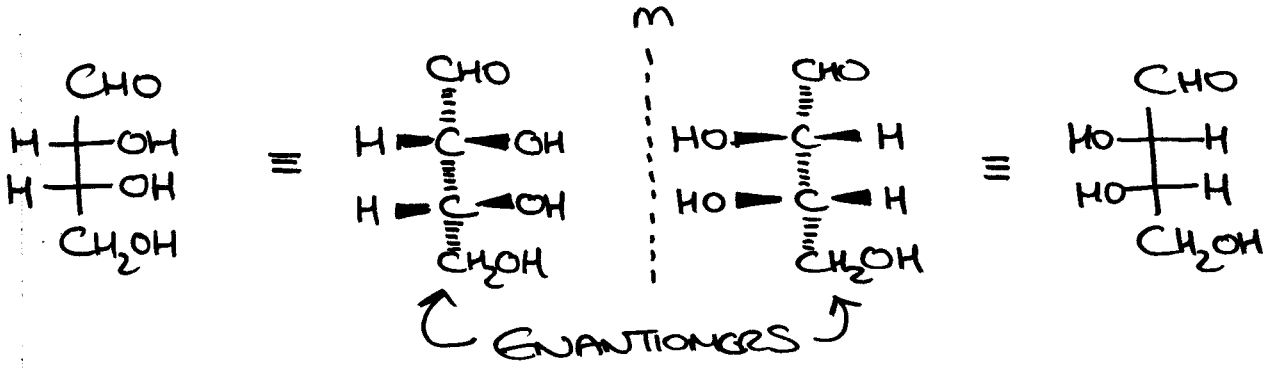


Glyceraldehyde

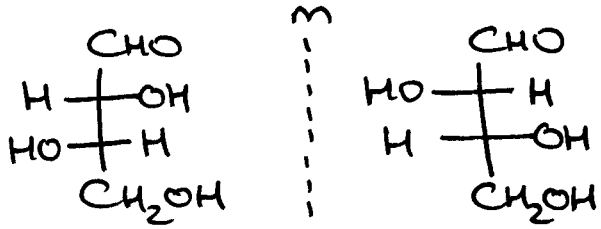
Useful for compounds with continuous STEREOCENTERS

2,3,4-trihydroxybutanal

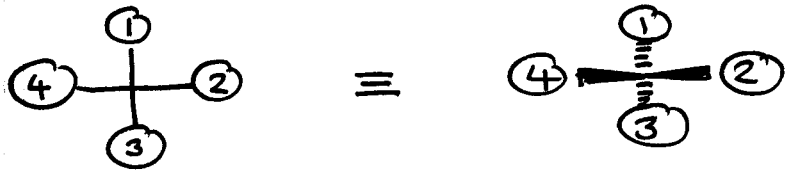




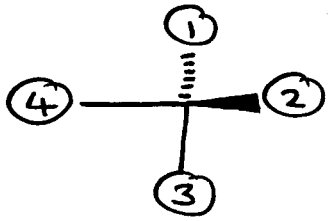
ANOTHER PAIR OF ENANTIOMERS



DETERMINING R/S FOR FISCHER PROJECTIONS



switch one wedge and one dash for STRAIGHT LINES



⇐ assign R/S

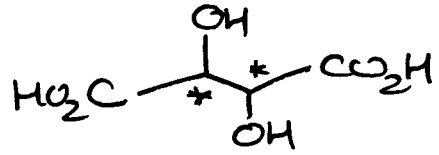
THIS ONE IS (S)

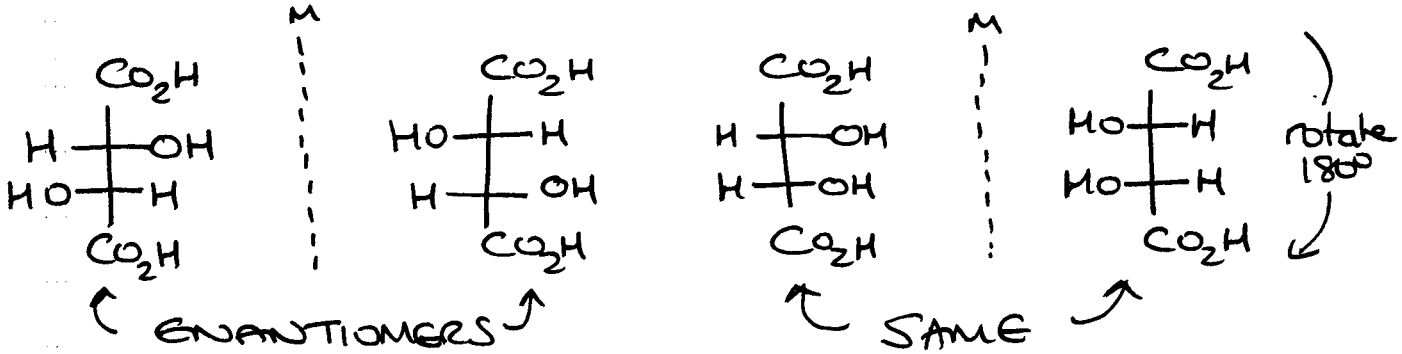
- Go BACK and DETERMINE R/S for 2,3,4-trihydroxybutanal

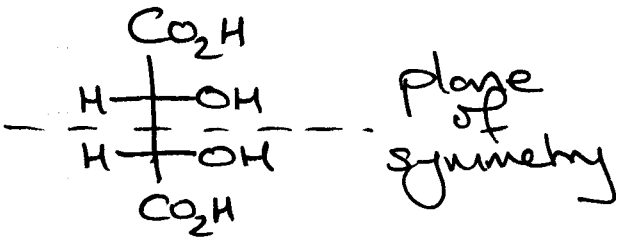
- A molecule with n chiral centers can have a maximum number of STEREOISOMERS = 2^n

2,3,4 trihydroxybutanal has 2 stereocenters

2^2 = 4 STEREOISOMERS

CONSIDER TARTARIC ACID 





COMPOUND w/ CHIRAL CENTERS, but is ACHIRAL

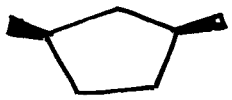
⇒ MESO

ENANTIOMERS ✓

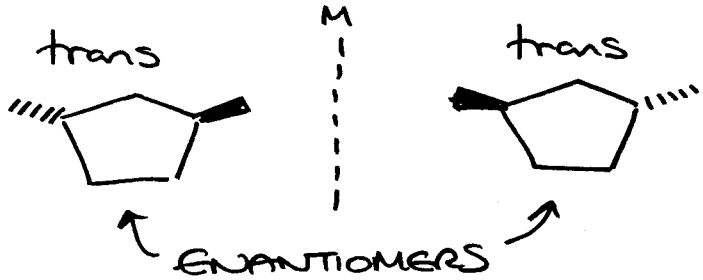
DIASTEREOISOMERS → CONFIGURATIONAL

DIASTEREOISOMERS → CIS/TRANS → RINGS, ALKENES

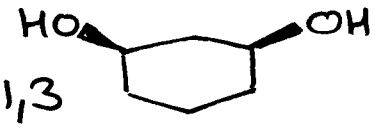
RINGS



cis
(meso)

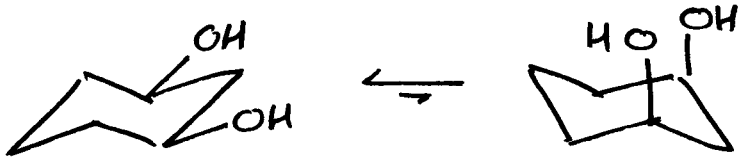


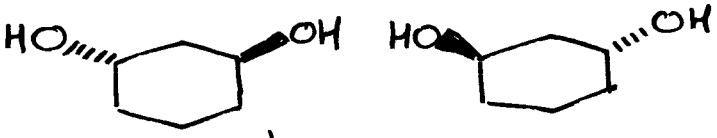
consider CYCLOHEXANES



1,3

cis
(meso)



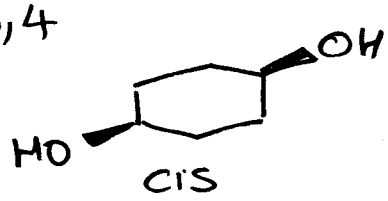


trans
ENANTIOMERS

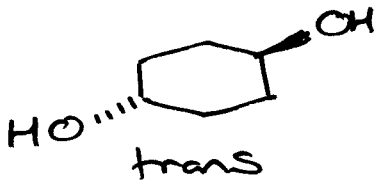
DRAW CHAIR FOR EACH AND DO A RING FLIP FOR EACH ENANTIOMER

(IN EACH CASE, CHAIRS ARE IDENTICAL)

1,4



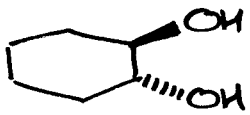
cis



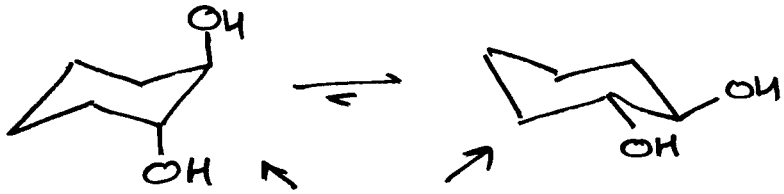
trans

BOTH ACHIRAL

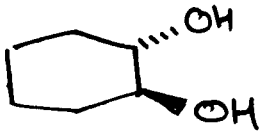
1,2

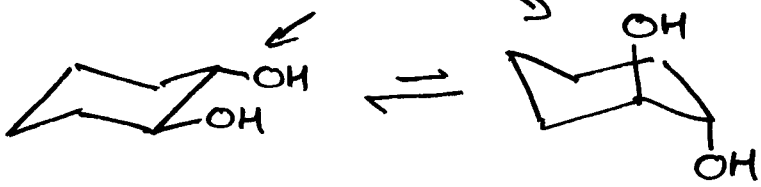


trans

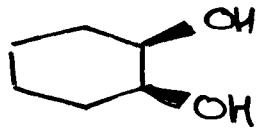


MIRROR IMAGES

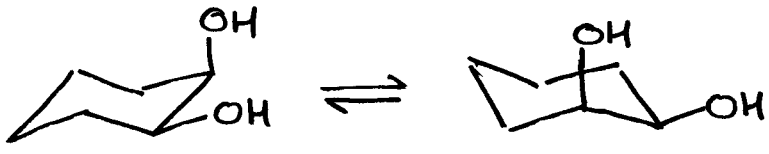




Cis

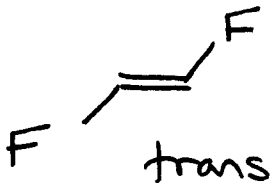


meso

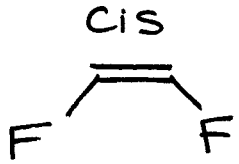


MIRROR IMAGES
(non superimposable)

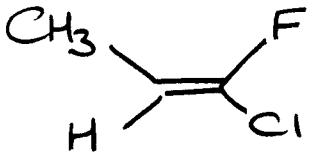
ALKENES

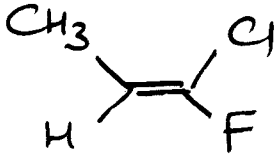


trans



DIASTEREOISOMERS



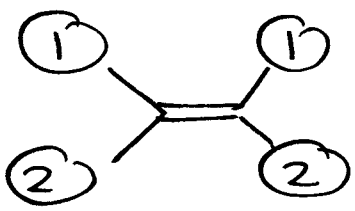


DIASTEREOISOMERS

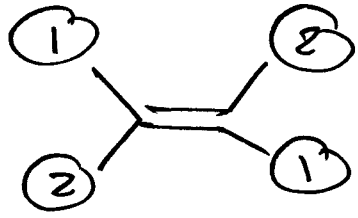
cis / trans?

(E) (Z)

Use same priority rules as for R/S on each C of the double bond.



Z



E