

- ① CIS/TRANS DIASTEREOMERS
- ② CONSEQUENCES OF CHIRALITY
- ③ RESOLUTION
- ④ ACIDS/BASES

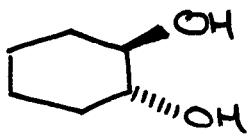
MIDTERM
 LOW 10
 HIGH 115
 MEAN 66
 (CHEATING...)

READ: 3.6 → 3.9 (3/4) Preview Ch 4

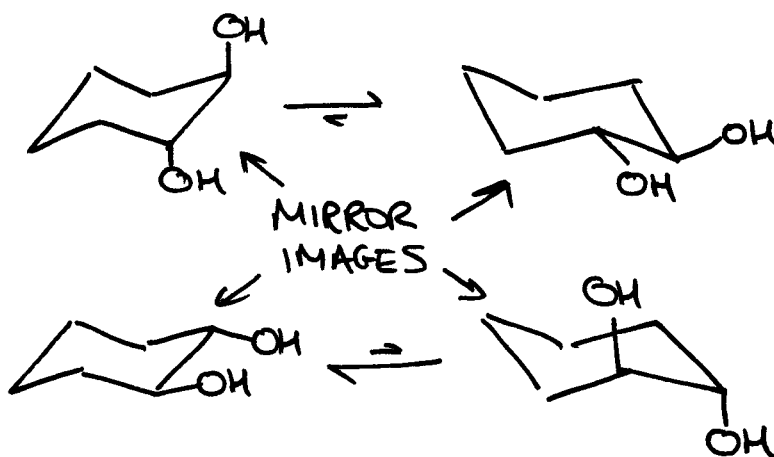
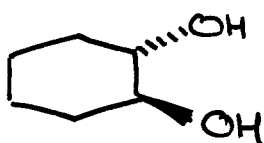
PROBLEMS: 3.9, 3.10, 3.39, 3.40 (4) 3.8, 3.9, (+ MOLECULAR MODELING Q)

① CIS/TRANS

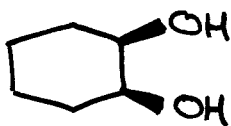
1,2



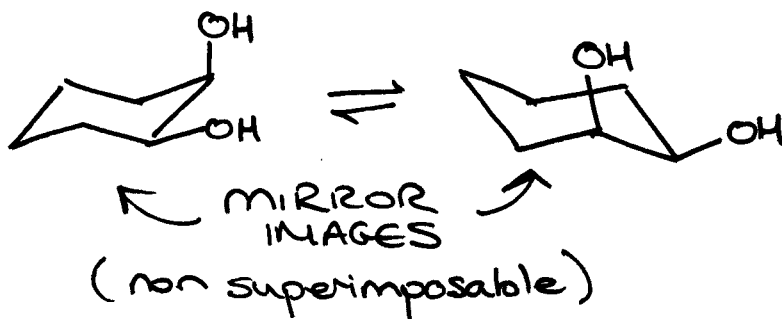
trans



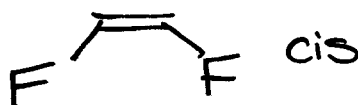
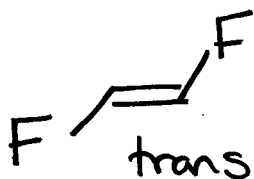
cis



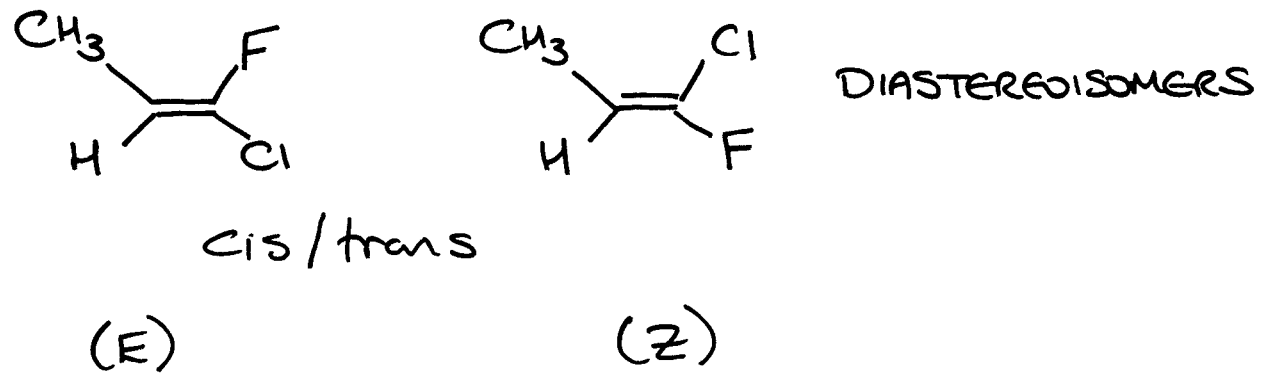
meso



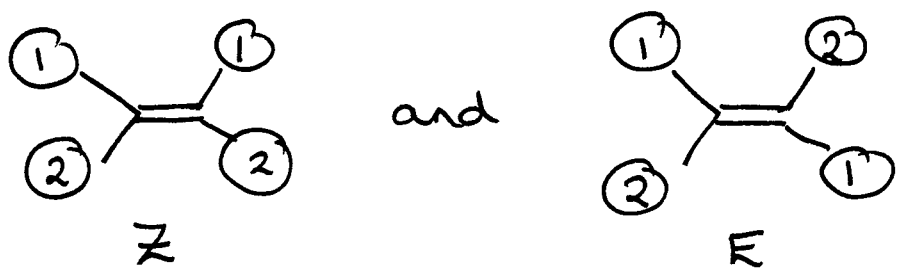
ALKENES



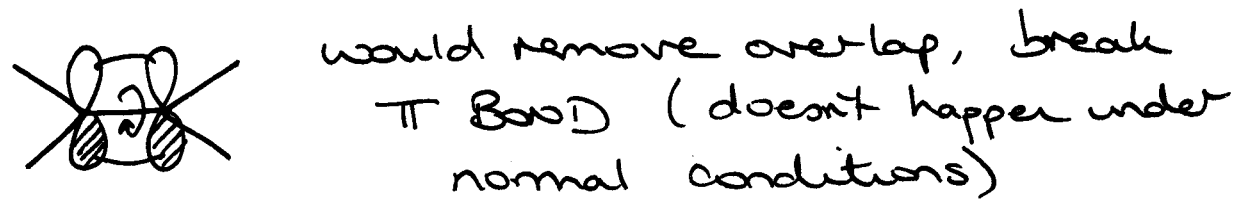
DIASSTEREOMERS



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



WHY NO ROTATION ABOUT DOUBLE BONDS?



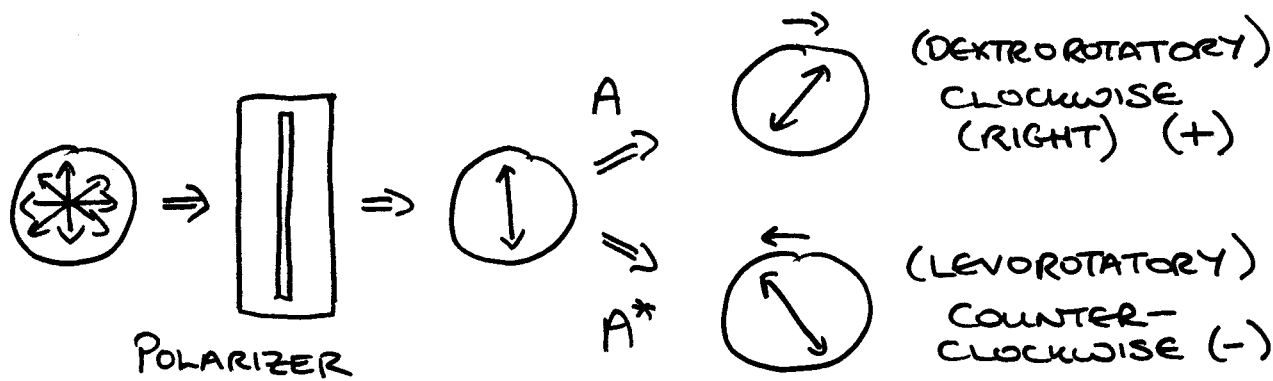
② CONSEQUENCES OF CHIRALITY

Properties of enantiomers \Rightarrow
 IDENTICAL PHYSICAL & CHEMICAL PROPERTIES
 (in an achiral environment)
 eg. mp, bp, solubility in water etc...

DIASTEREOMERS - different...

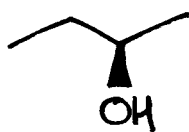
OPTICAL ACTIVITY

- rotation of plane polarized light



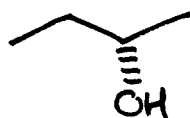
Specific Rotation $[\alpha]_{\lambda}^T = \frac{\text{Obs rotation } (^{\circ})}{\text{Length (dm)} \times \text{conc (g/mL)}}$

T = temperature λ = wavelength of light



(R)-2-BUTANOL

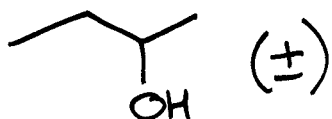
$[\alpha]_D^{25} -13.52^{\circ}$



(S)-2-BUTANOL

$[\alpha]_D^{25} +13.52^{\circ}$

1:1 mixture \Rightarrow RACEMIC MIXTURE,
specific rotation = ϕ

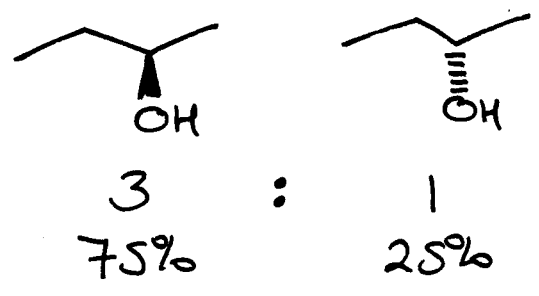


NO RELATIONSHIP b/w R/S and +/-

enantiomeric excess (ee)

$$ee = \frac{[R] - [S]}{[R] + [S]} \times 100$$

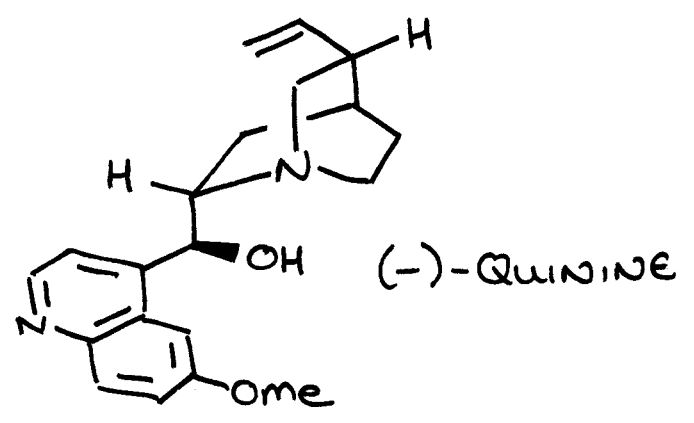
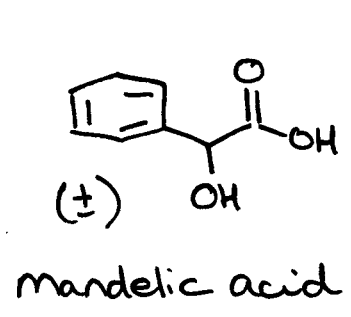
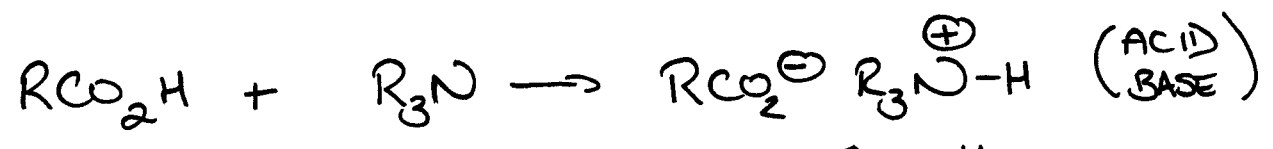
$$= \%R - \%S$$



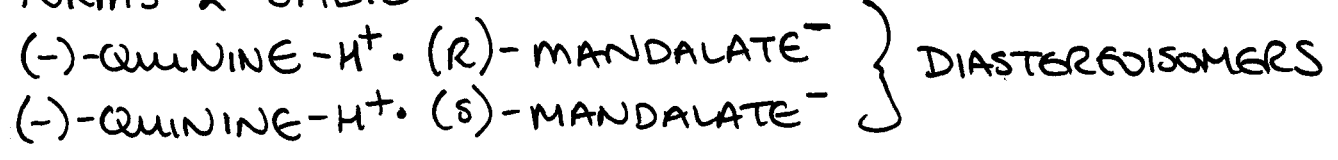
$$[\alpha]_D^{25} = ? -6.76^\circ$$

$$ee = 50\%$$

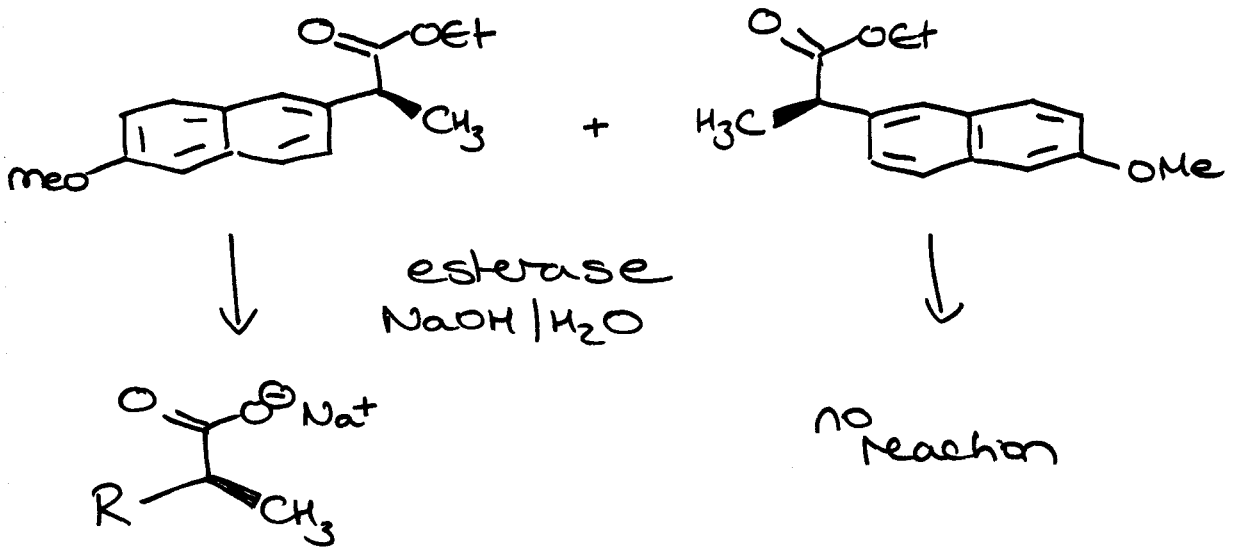
③ RESOLUTION (i) Natural products



FORMS 2 SALTS



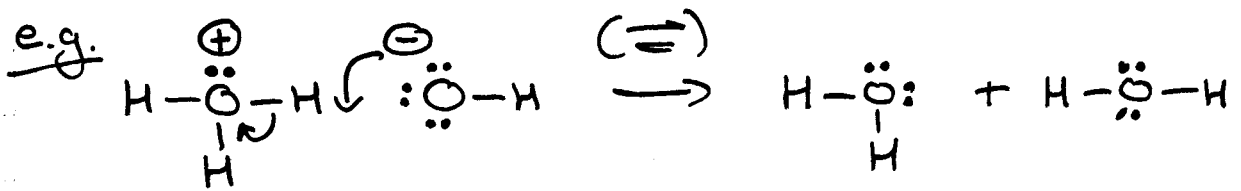
(ii) ENZYMES



READ 3.9 - CHIRALITY IN BIOLOGICAL WORLD

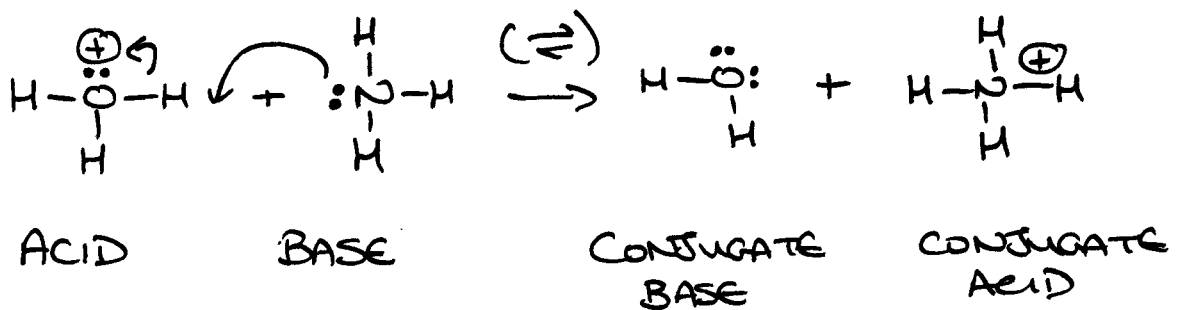
④ ACIDS & BASES

BRONSTED/LOWRY ⇒ ACID H⁺ DONOR
BASE H⁺ ACCEPTOR



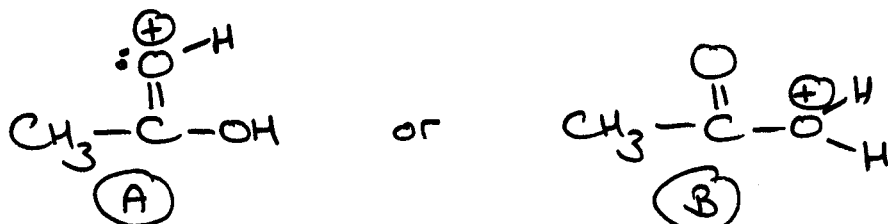
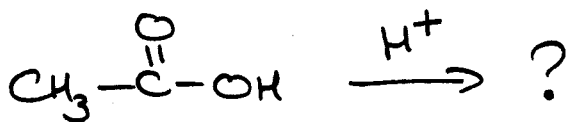
ACID (H⁺ DONOR) BASE (H⁺ ACCEPTOR)

hydronium ion hydroxide ion

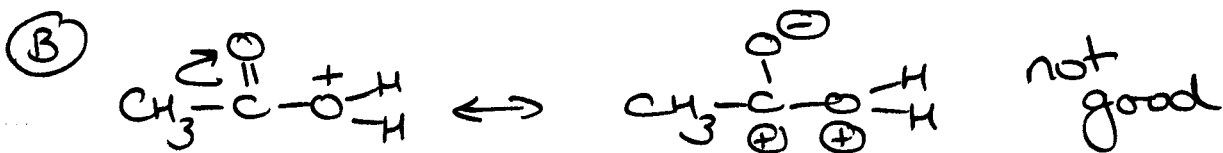
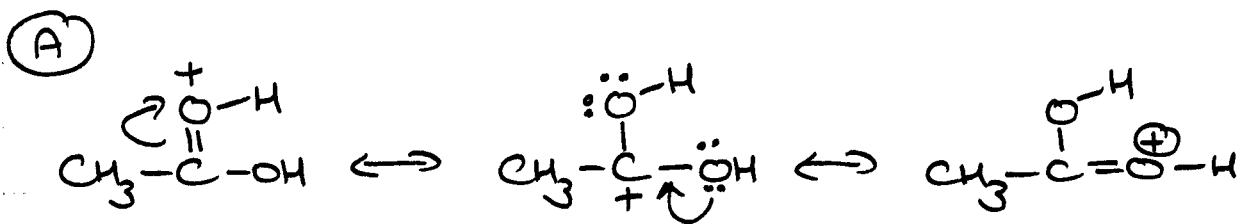


6

(i) ORGANIC STRUCTURES



consider resonance



In $\overset{\cdot\cdot}{\text{O}}=\text{C}$ more basic than $\text{C}-\overset{\cdot\cdot}{\text{O}}\text{H}$ in $-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$

