

LEC ⑪

CHEM 30A

Oct 24th ①

① CIS/TRANS DIASTEREISOMERS

② CONSEQUENCES OF CHIRALITY

③ RESOLUTION

④ ACIDS/BASES

MIDTERM WEDS

READ 3.6-3.9

A-J CS76

PROBLEMS 3.8, 3.9, 3.34-3.40

K-Z CS50

① CIS/TRANS DIASTEREISOMERS

LEC ⑩ pages 7, 8

Why no rotation about double bonds?



would remove overlap & break
the π BOND (doesn't happen under
normal conditions)

② CONSEQUENCES OF CHIRALITY

Properties of enantiomers \Rightarrow

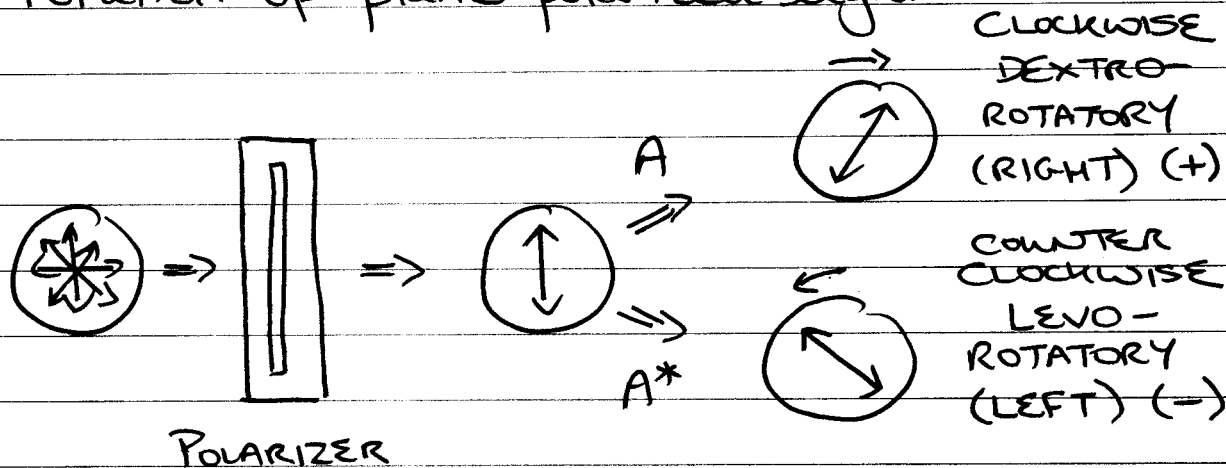
IDENTICAL PHYSICAL & CHEMICAL PROPERTIES
(in an achiral environment)

e.g. mp, bp, solubility in water etc...

DIASSTEREISOMERS - different....

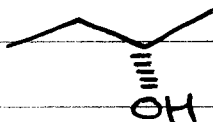
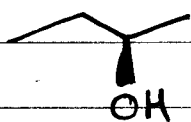
OPTICAL ACTIVITY

- rotation of plane polarized light



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

T = temperature λ = wavelength of light



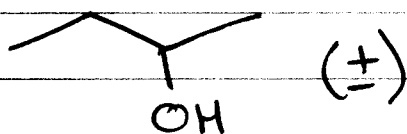
(R)-2-BUTANOL

(S)-2-BUTANOL

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

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

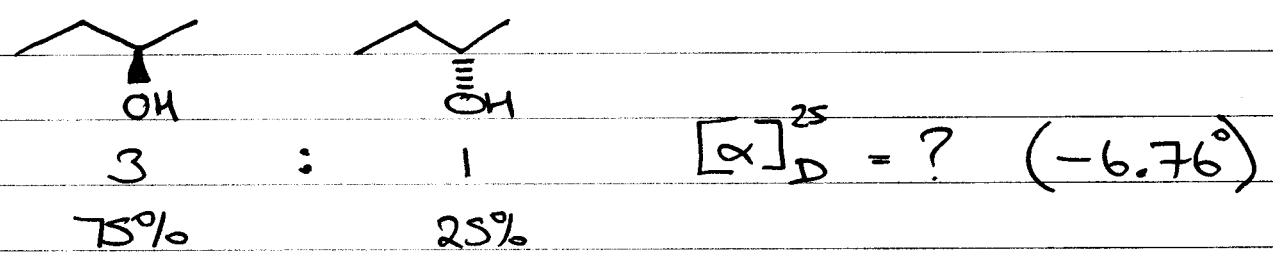
1:1 mixture \Rightarrow RACEMIC MIXTURE
specific rotation = ϕ



No relationship between R/S and +/-
enantiomeric excess (ee)

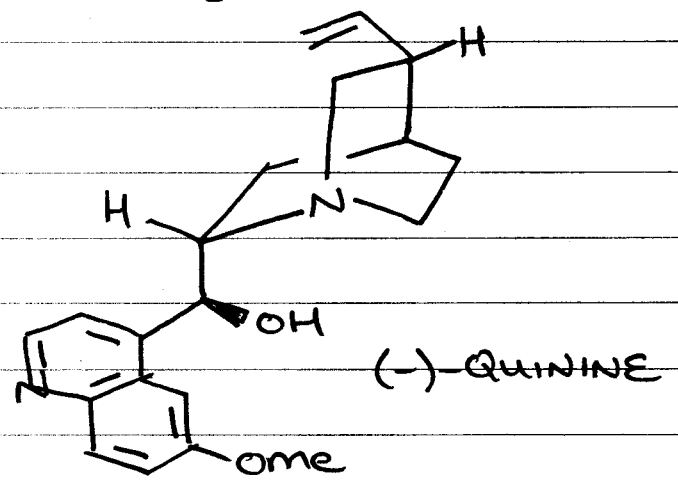
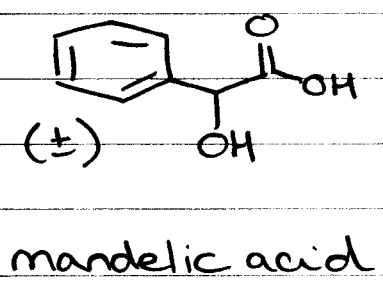
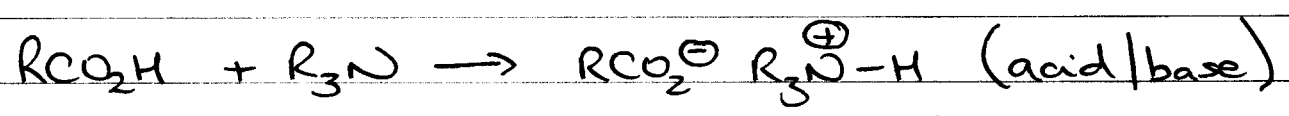
$$ee = \frac{[R] - [S]}{[R] + [S]} \times 100$$

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

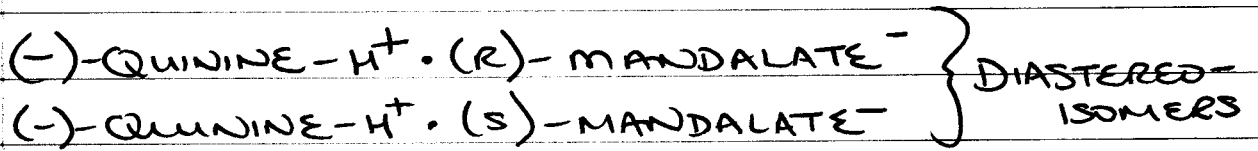


ee = 50%

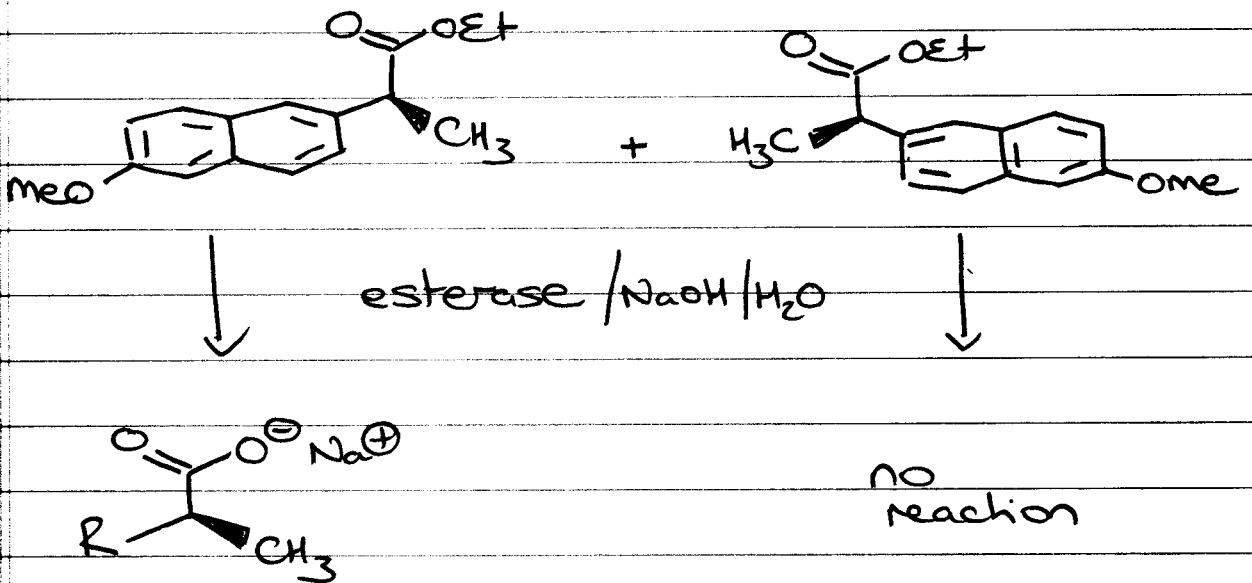
③ RESOLUTION (separation of enantiomers)
(i) Natural products



Form 2 salts



(ii) ENZYMES

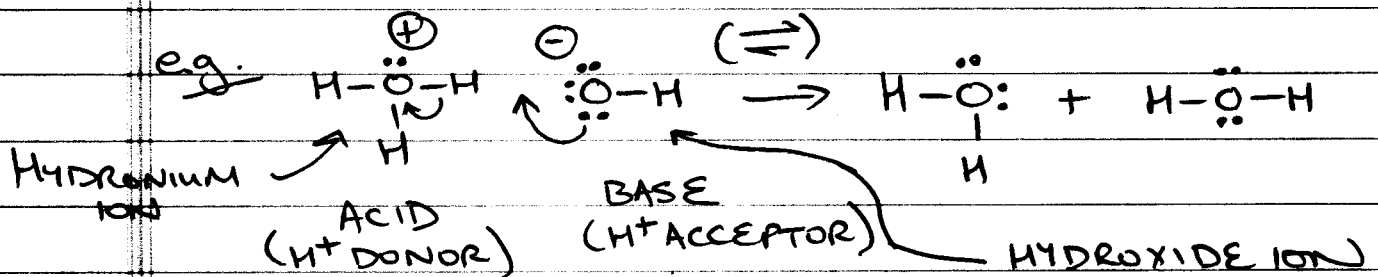


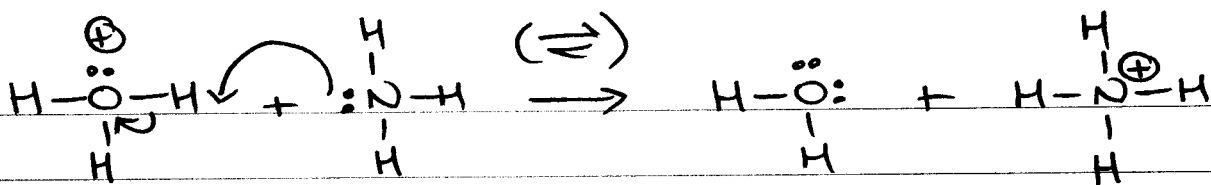
(iii) CHROMATOGRAPHY \Rightarrow read.

READ 3.9 CHIRALITY IN BIOLOGICAL WORLD

④ ACIDS & BASES

BRONSTED/LOWRY \Rightarrow ACID H⁺ DONOR
BASE H⁺ ACCEPTOR





ACID

BASE

CONJUGATE
BASE

CONJUGATE
ACID

— next :

Protonating organic structures.