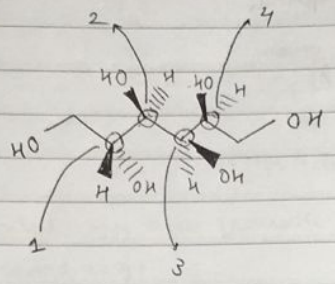
Nirali Modi
2020UMT0175
@nmodi

classmate
Date
Page

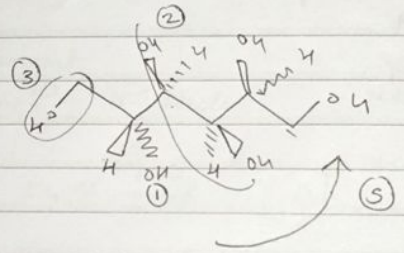
Minor 2

1)
a)



The circled carbons denote the chiral centres as they are assymetric (4 different groups connected to it).

For first carbon



But since H at front,

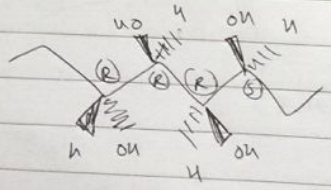
∴ (R)

Same way,
second carbon : (R)

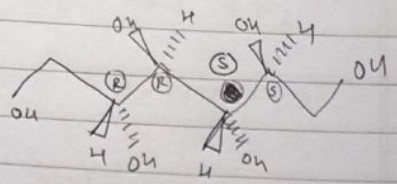
third carbon : (R)

fourth carbon : (S)

∴

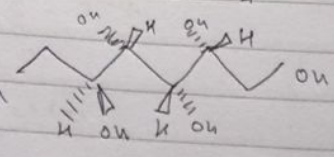


b) Now seeing R/S of A :



A is ~~Diastereomer~~ with sorbitol.

Now seeing R/S of B :



1 b) continued

B is enantiomer with sorbitol.

c) No of stereomers obtain = 2^n where n = No of chiral centres
= 4

$= 2^4$

$= 16$

2] i)

Given: Specific rotation of pure (+) enantiomer = +158°

a) 25% conc of (-) Mandelic acid
75% " (+) "

∴ ee (Enantiomeric Excess) = 75% − 25%
= 50%

From formula $ee = \frac{\text{Observed specific rotation}}{\text{Specific rotation of pure (+) enantiomer}} \times 100\%$

$50 = \frac{x}{158} \times 100$

$\therefore x = +79$

∴ Specific rotation of (+) Mandelic acid = +79°
(−) " = −79°

b) 50% conc of (-) Mandelic acid
= (+)

∴ ee = 50% − 50%
= 0

∴ 0 = observed specific rotation (x)
∴ x = 0

2) Continued ∴ Specific rotation of (−) Mandelic = 0°
(+) Mandelic = 0°

c) 75% conc of (−) mandelic acid
25% conc of (+) Mandelic acid

ee = −75% + 25%
= −50%

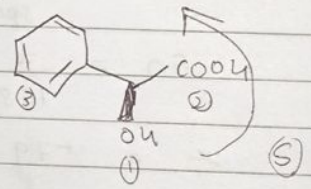
By formula

$-50 = \frac{x}{158} \times 100\%$

$x = -79$

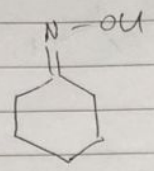
Specific rotation of (−) Mandelic = +79
(+) Mandelic = −79

ii) Since specific rotation is negative (−118.5°)
d) configuration is (S).

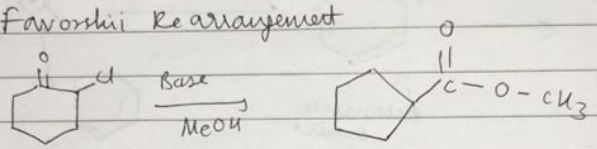


e) Enantiomeric composition:
100% S configure
0% R configure

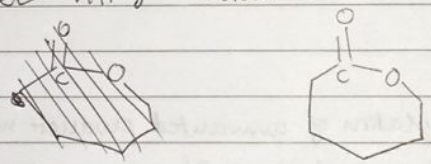
3] a)



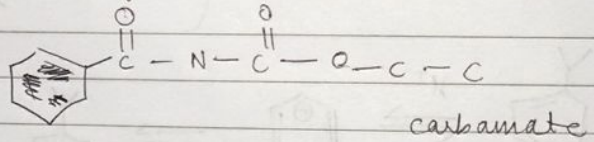
b) Favorskii Rearrangement



c) Baeyer-Villiger oxidation.

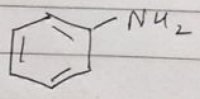


d) ~~Hoffman bro... rearrangement / degradation.~~
Curtius Rearrangement

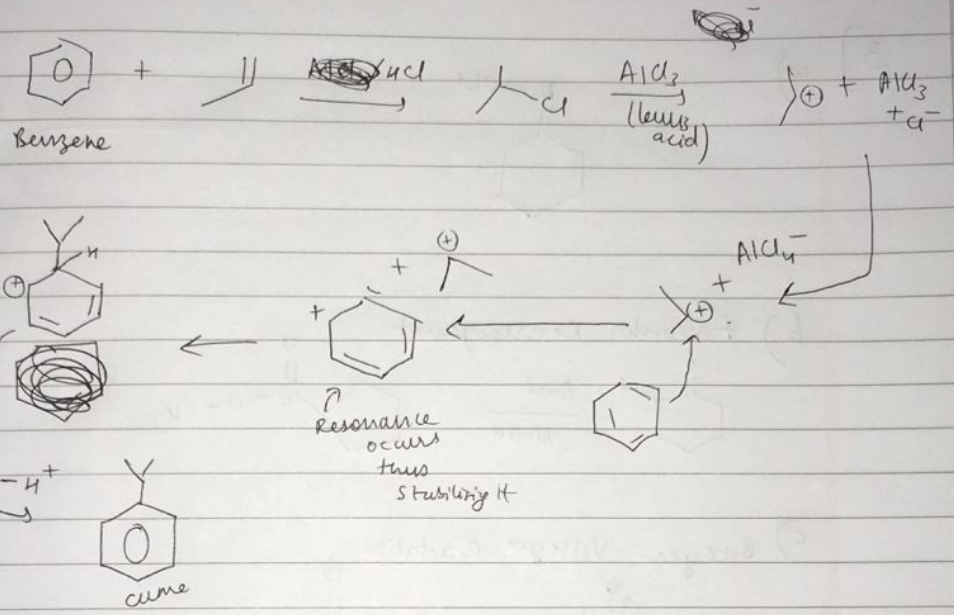


carbamate

e) Hoffman degradation / Rearrangement.

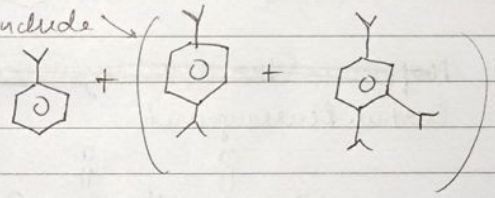


4)

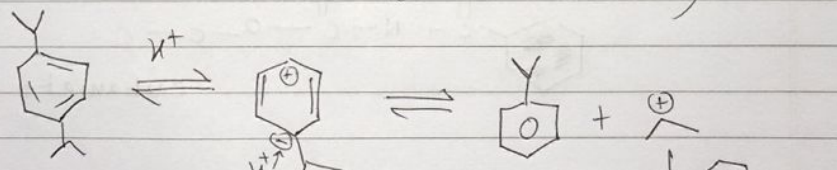


But now transalkylation of unwanted product may occur,

side products include →



∴



Desired

thus giving high selectivity more than 99%.

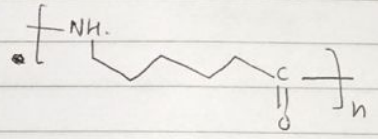
5) Natural polymer-based products include:

cellulose, natural rubber, silk, Deoxyribonucleic acid
(food) (car tyres) (clothes) (needed for survival)

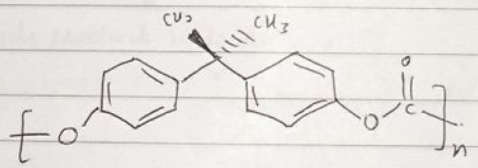
Synthetic polymers include:

Teflon, nylon, polyester, PVC – Polyvinyl chloride, &
(Used in pans to cook) (Polyethylene) (clothes) (bags)

Structure of nylon – 6



Polycarbonate

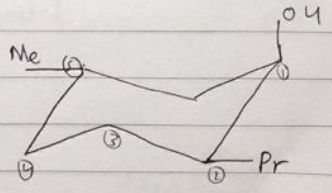


6)

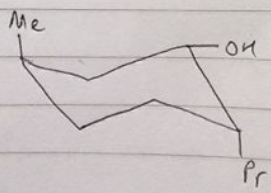
i) a) stereoselective

b) stereospecific

ii) Stable conformer:



Enantiomer:



6) (iii)