

HND

⌚: 2½ hrs

Chemistry 212
Final Examination

Feb. 11, 1998
A. Salameh

Family Name: Naakman

First Name: Joseph

Student Number: 200500623 Section: 1

Question I _____ out of 20

II _____ out of 50

III _____ out of 40

IV _____ out of 20

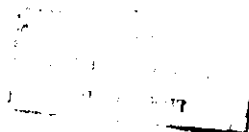
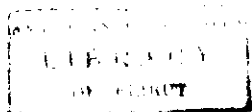
V _____ out of 18

VI _____ out of 10

VII _____ out of 15

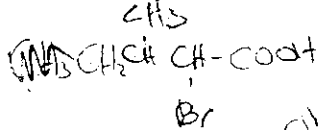
VIII _____ out of 27

Total _____ out of 200%



I (20 pts) Give the structure of each of the following:

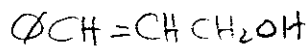
a) α -Bromoisovaleric acid.



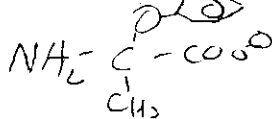
b) p-Tolylbenzyl ether.



c) Cinnamylalcohol.



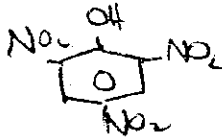
d) Carbobenzoxyalanine.



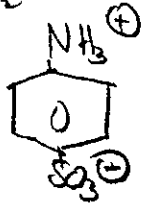
e) 4-(N,N-Diethylamino) benzaldehyde.



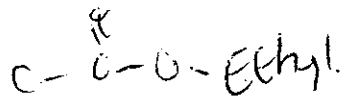
f) Picric acid.



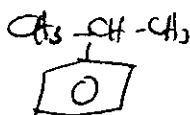
g) Sulfanilic acid.



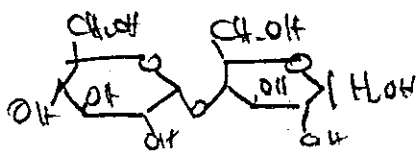
h) Ethylbenzoylacetate.



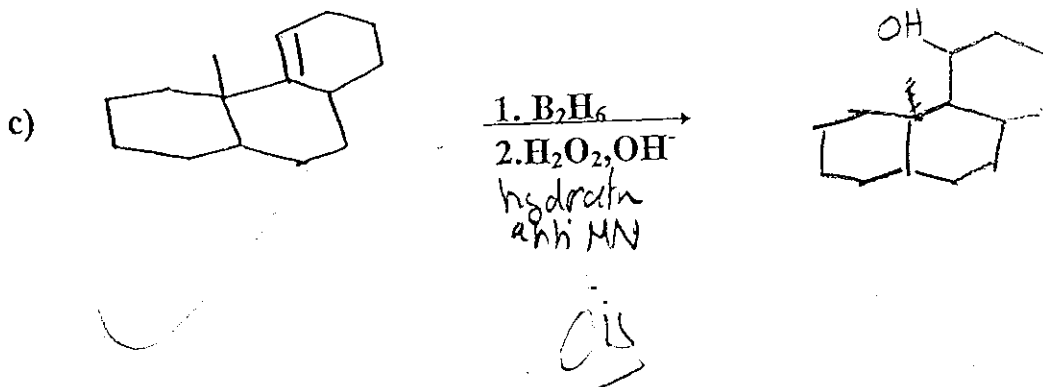
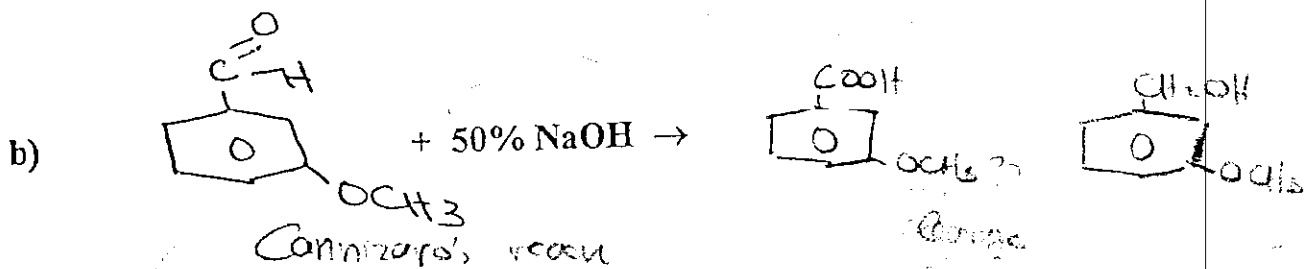
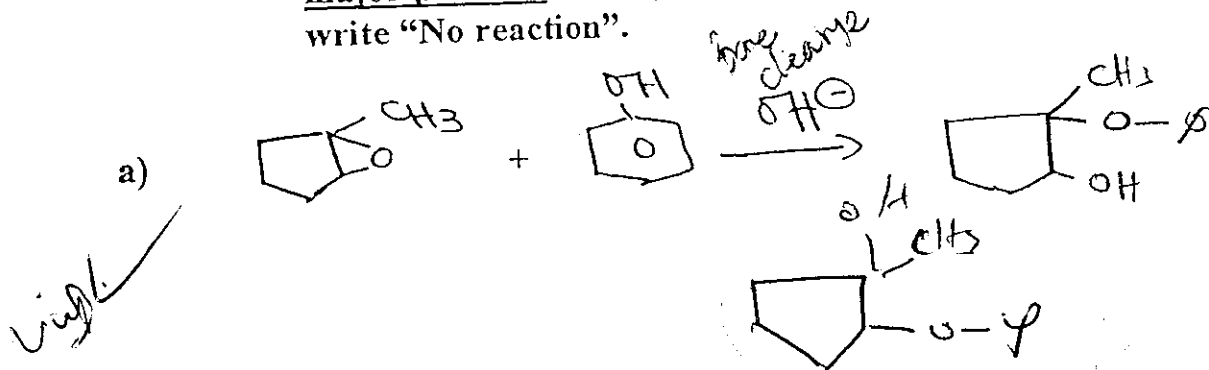
i) Cumene.



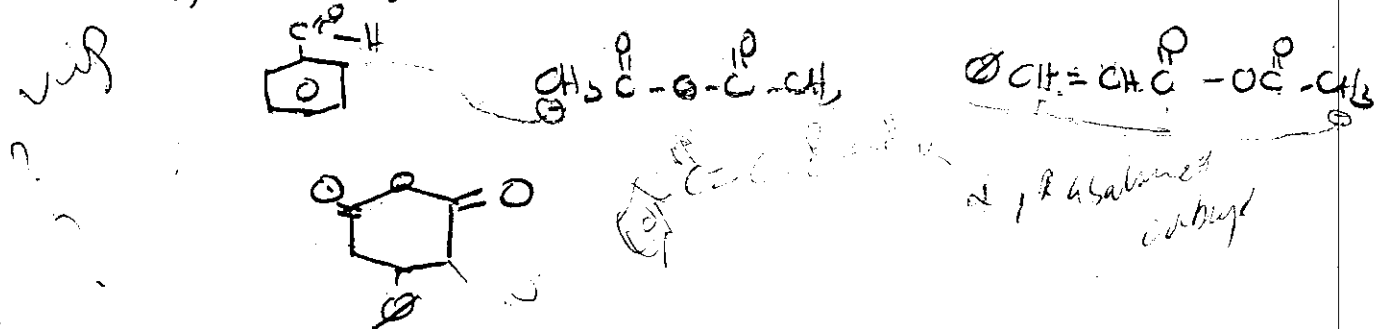
j) 4-O-(α -D-glucopyranosyl)-D-glucopyranose (Haworth structure).

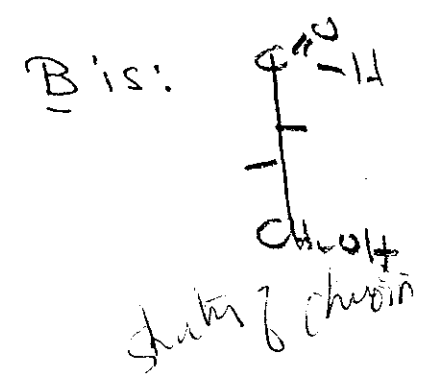
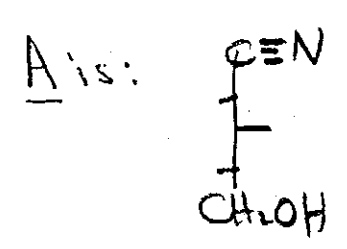
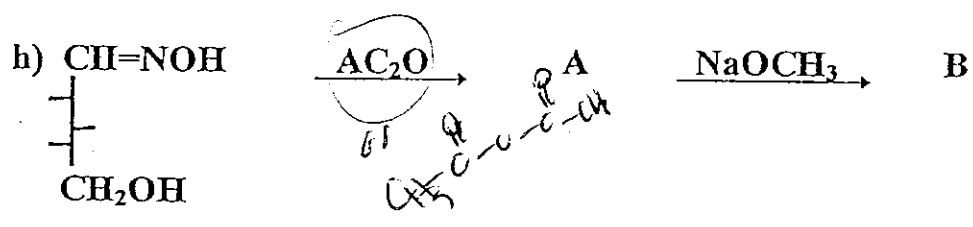
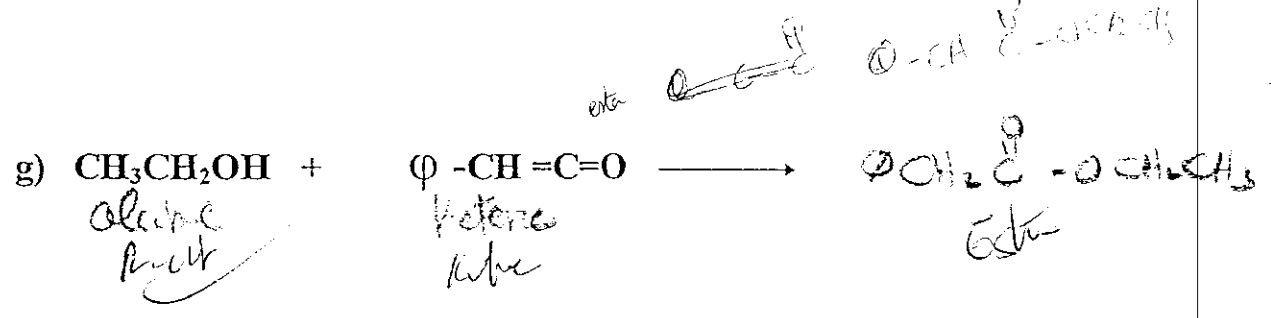
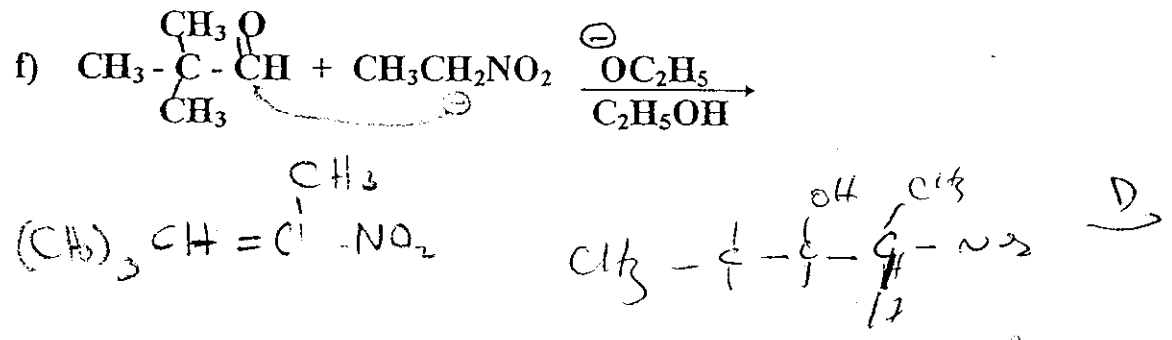
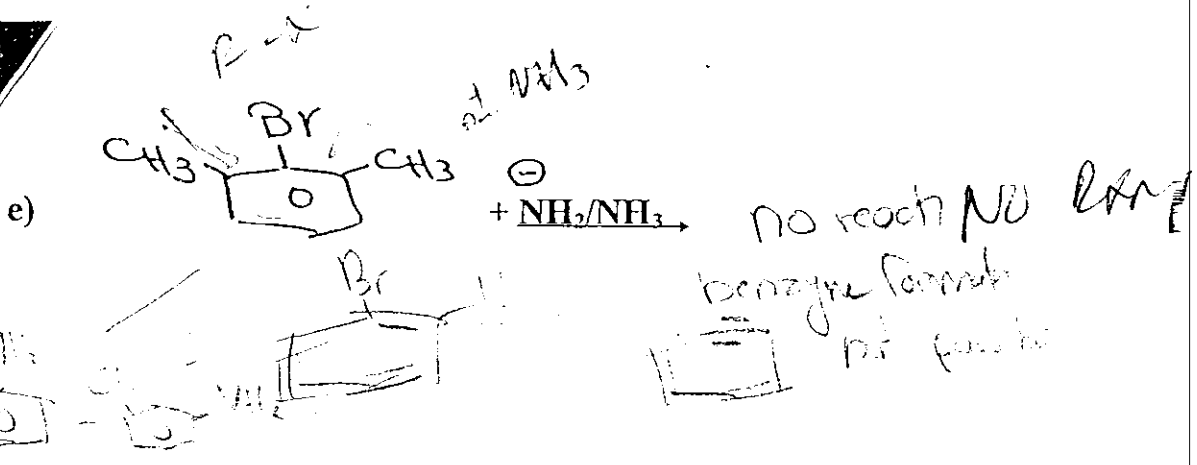


II (50 pts) Complete each of the following reactions specifying the major product where possible. If no reaction takes place write "No reaction".

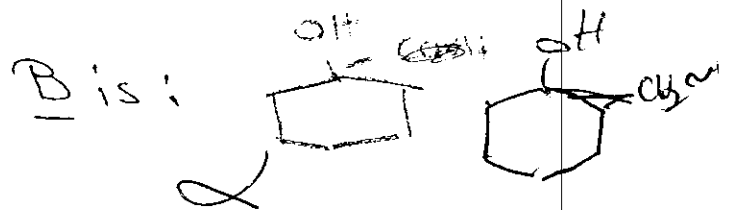
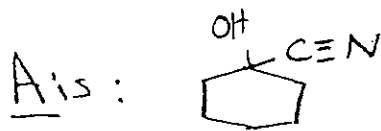
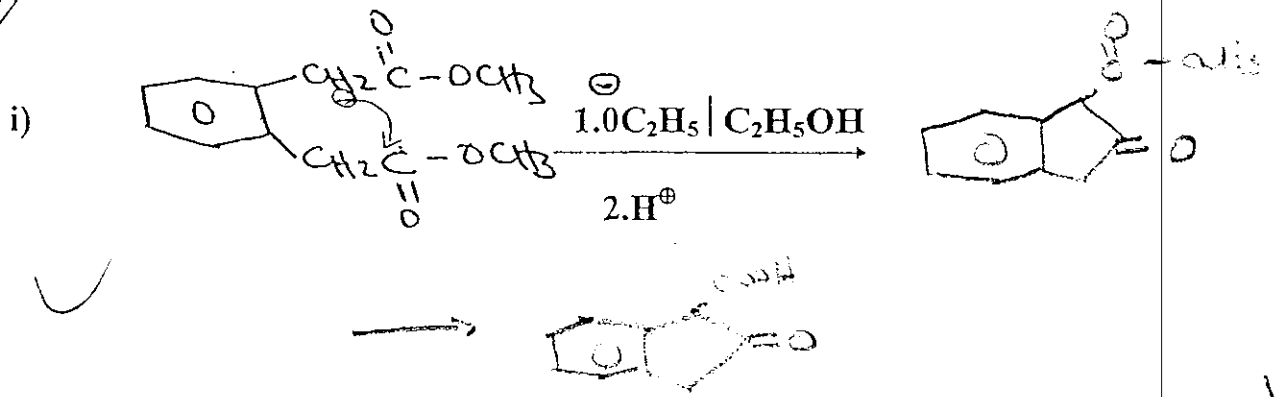


d) Benzaldehyde + Acetic anhydride $\xrightarrow{\text{CH}_3\text{COONa}}$

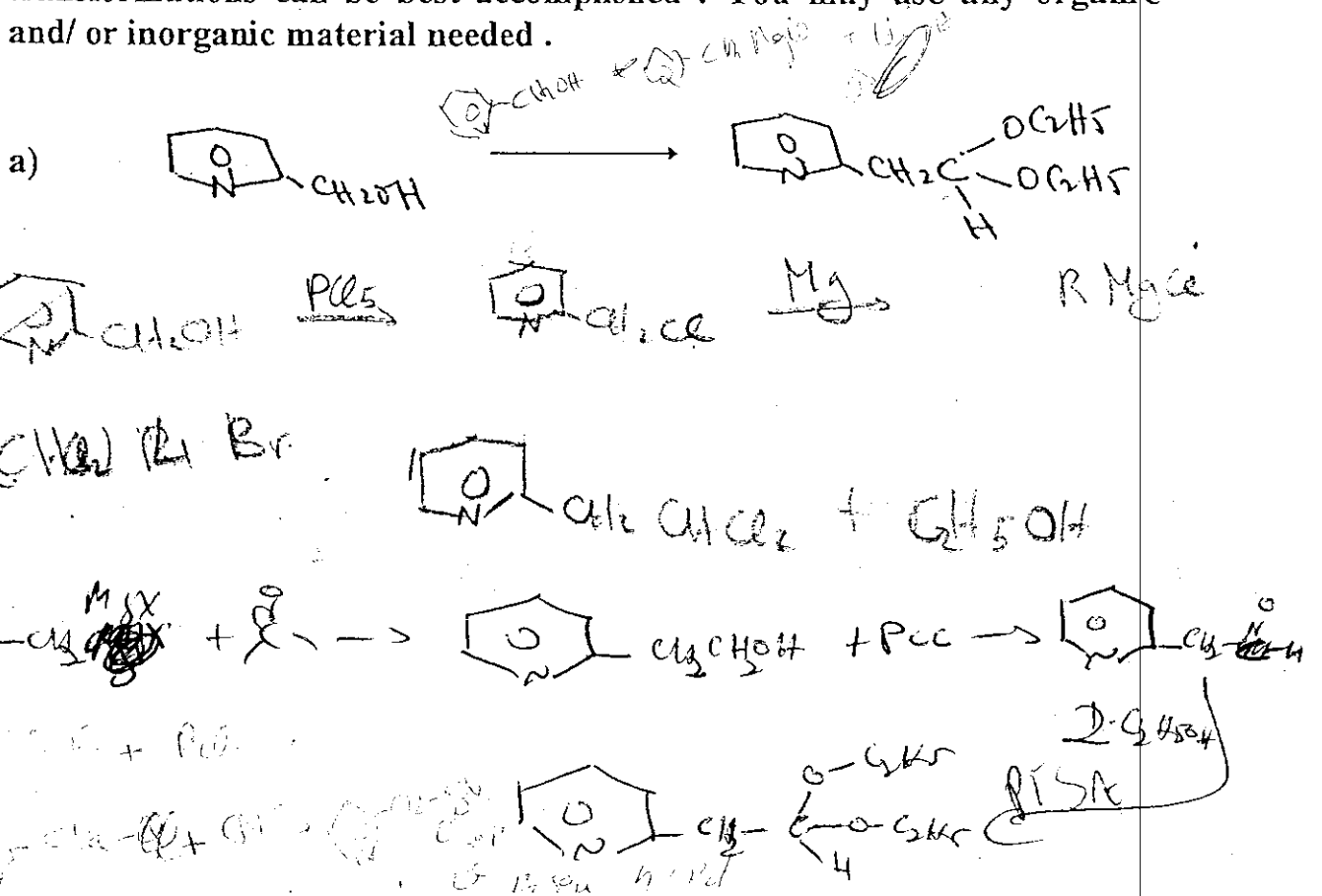


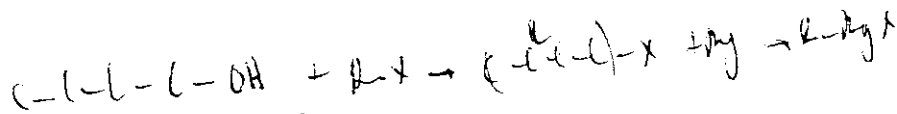


diff product

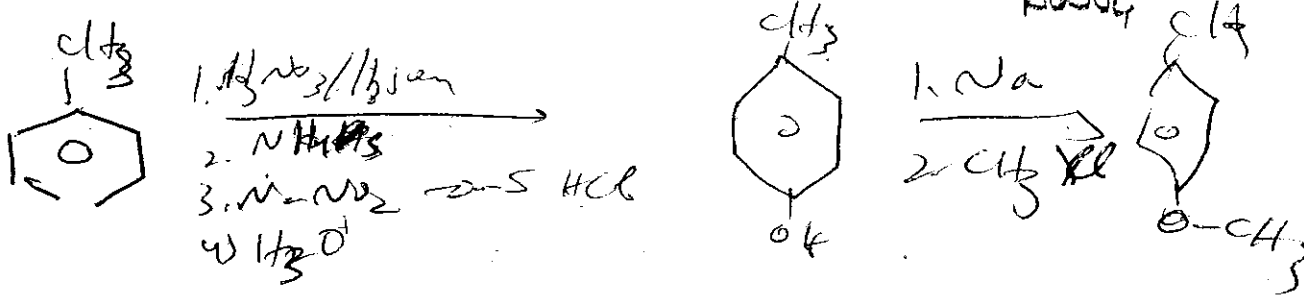
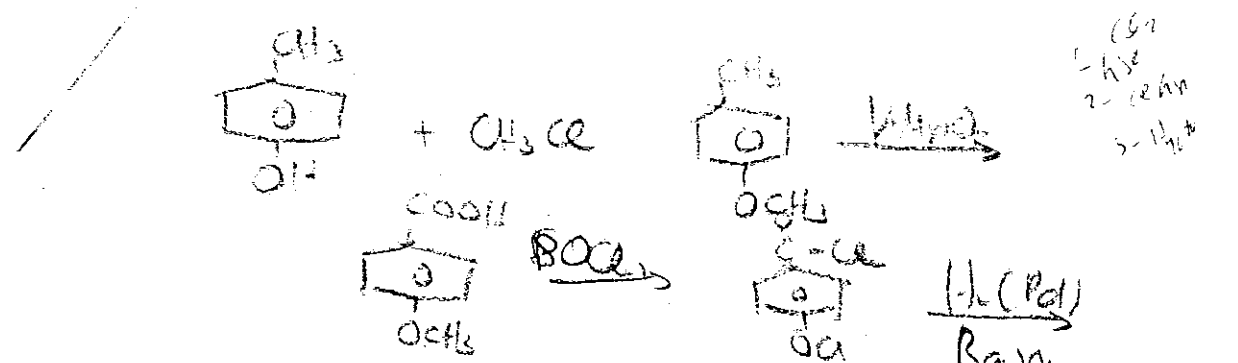
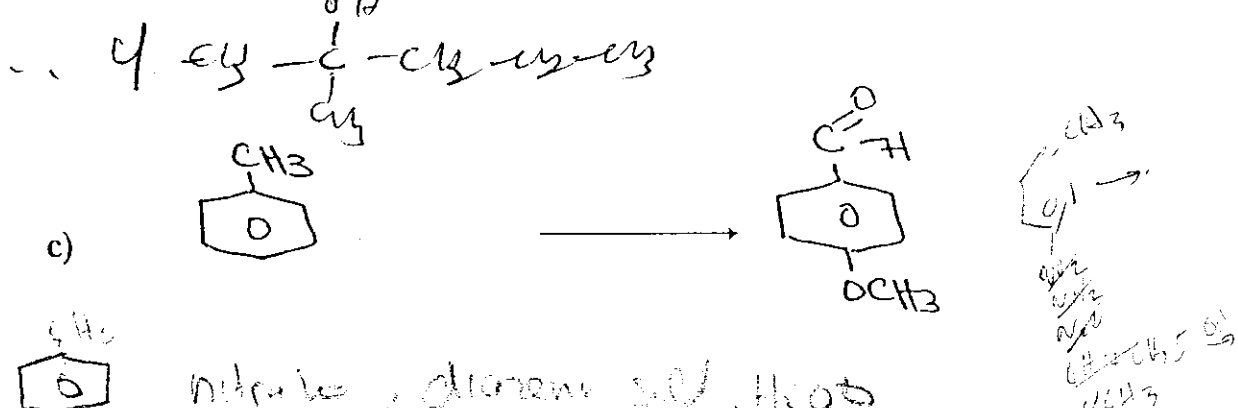
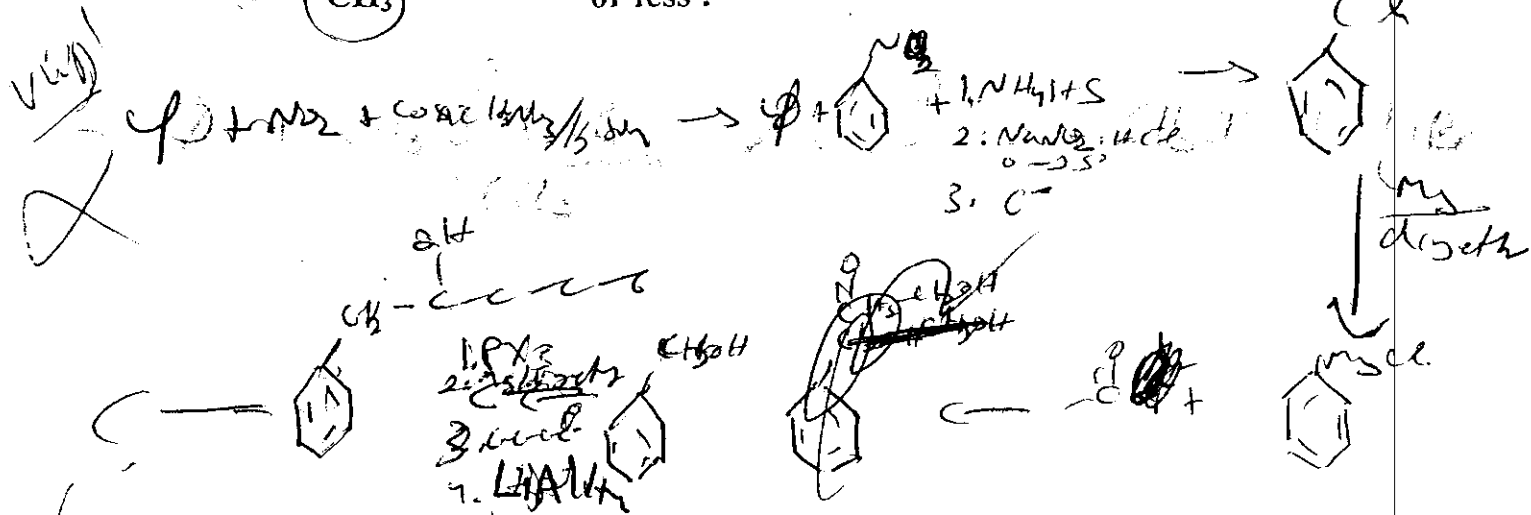


III (40pts) Write chemical equations to show how the following transformations can be best accomplished. You may use any organic and/or inorganic material needed.

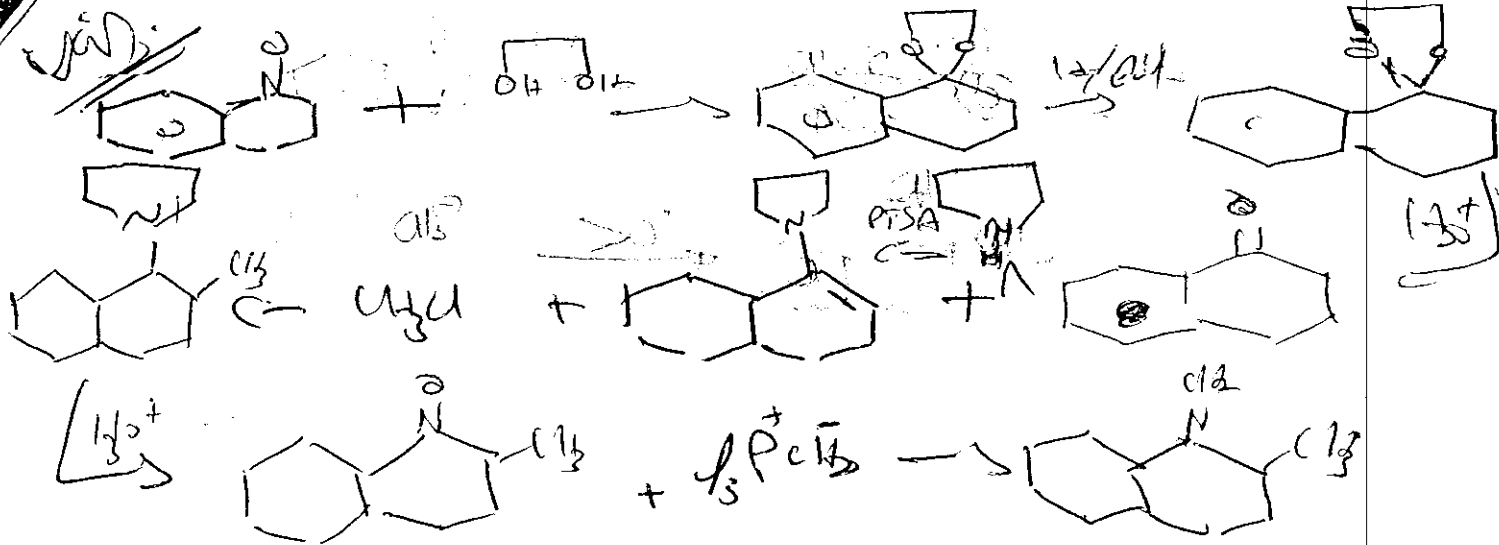
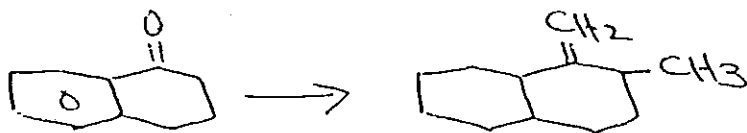




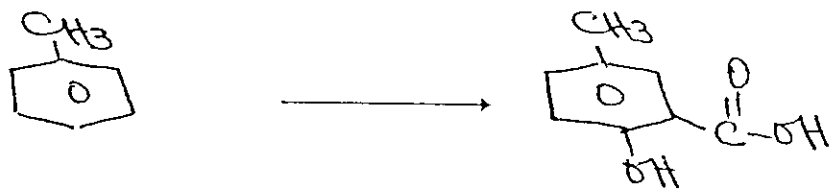
b) ϕ $\text{CH}_2\text{C}(\text{OH})(\text{CH}_3)\text{CH}_2\text{CH}_2\text{CH}_3$ from benzene and any compound of 4 carbons or less.



d)



e)



nitrate



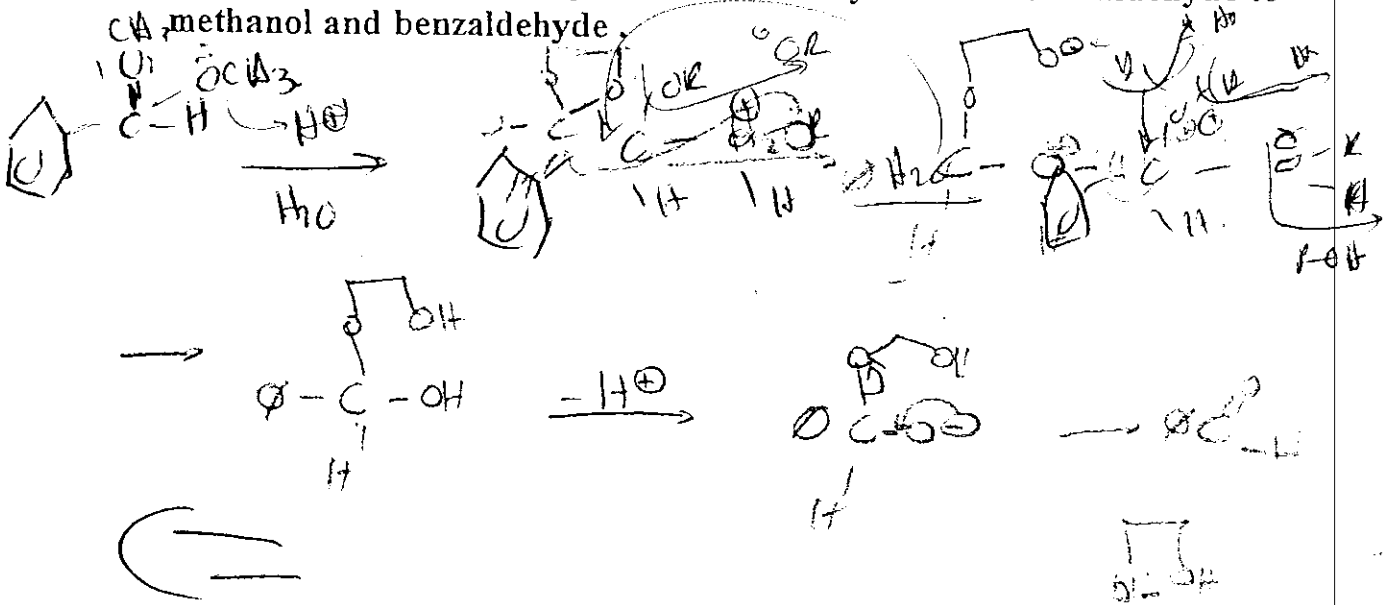
mülbe
 syntros

f)

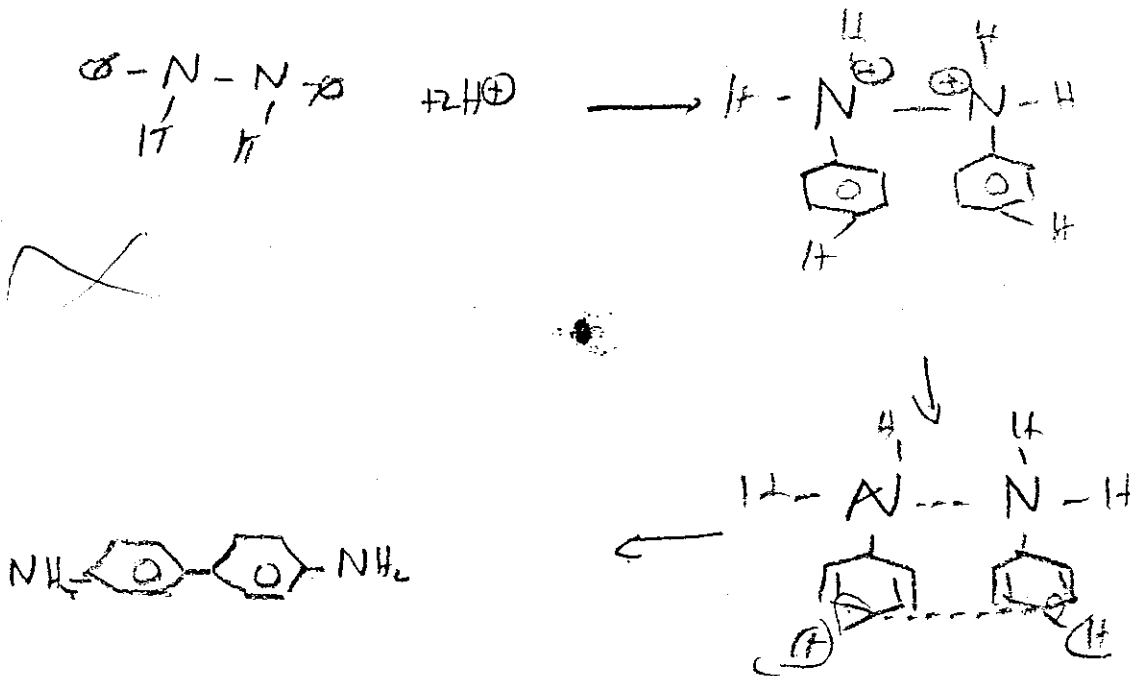
- 1- CC(=O)O
- 2- Ph/cal
- 3- CC(=O)O / LDA
- 4- H_2O
- 5- CC(=O)O + LiP(=O)(O)O

IV (20pts) Write a detailed mechanism for each of the following :

a) The acid catalyzed hydrolysis of the dimethylacetal of benzaldehyde to CA, methanol and benzaldehyde



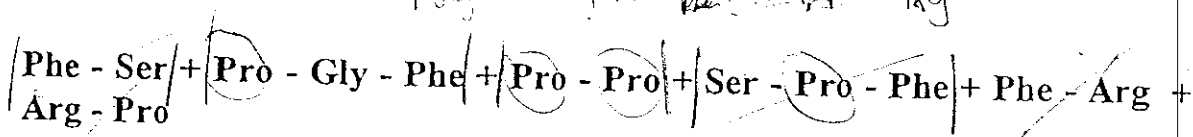
b) Hydrazobenzene $\xrightarrow{H^+}$ benzidine .



V (18pts)

a

a) Bradykinin is a nonapeptide released by blood plasma globulins in response to a wasp sting. Its molecular formula is Arg_2 , Gly, Phe_2 , Pro_3 , Ser. Sanger's reagent shows that both terminal residues are arginine. Partial hydrolysis of bradykinin gives the following di- and tripeptides:

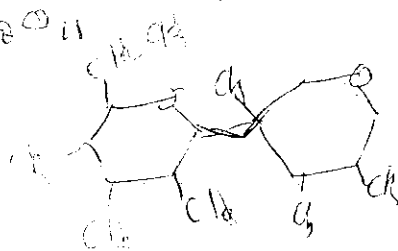


What is the amino acid sequence of bradykinin. (No partial credit).



b) Gentiobiose is a disaccharide found in a number of natural products. It has the formula $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ and is a reducing sugar. It is hydrolyzed by emulsin to glucose. 2, 3, 4, 6 - Tetra - O - methyl - D glucopyranose and 2, 3, 4, tri - O - methyl - D - glucopyranose are obtained when gentiobiose is converted to its fully methylated form and then hydrolyzed. What is the structure of gentiobiose?

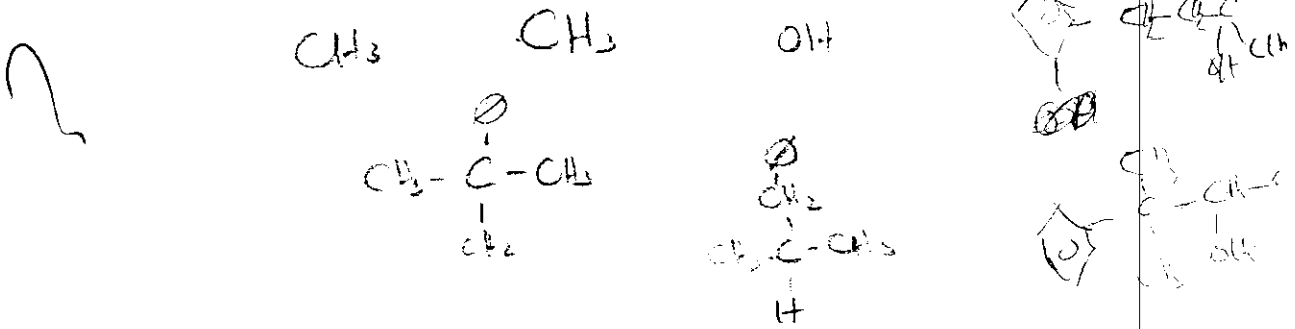
$\text{C}_{12}\text{H}_{22}\text{O}_{11}$



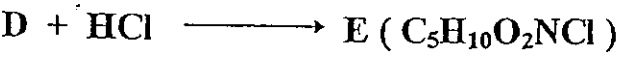
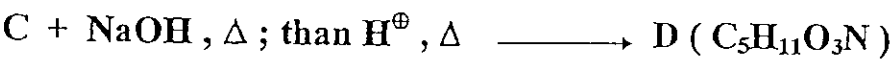
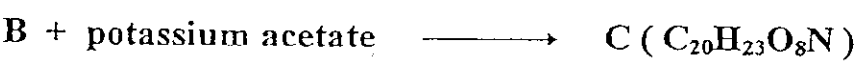
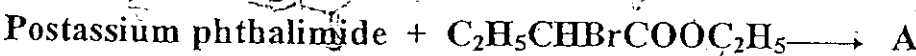
Handwritten notes: $\text{dot } H = 4 \Rightarrow \emptyset$ 4

VI (10pts) Compound L, $C_{11}H_{16}O$ is insoluble in water but dissolves in phenol aqueous NaOH. It's infrared spectrum shows a broad absorption band in the 3200 - 3600 cm^{-1} region; it's ^1H NMR spectrum consists of: Singlet Δ 0.80; singlet Δ 1.2 (6H) quartet Δ 1.5, singlet Δ 4.5 (1H) and a multiplet Δ 7.0 (4H). Give a possible structure for L. Show your work.

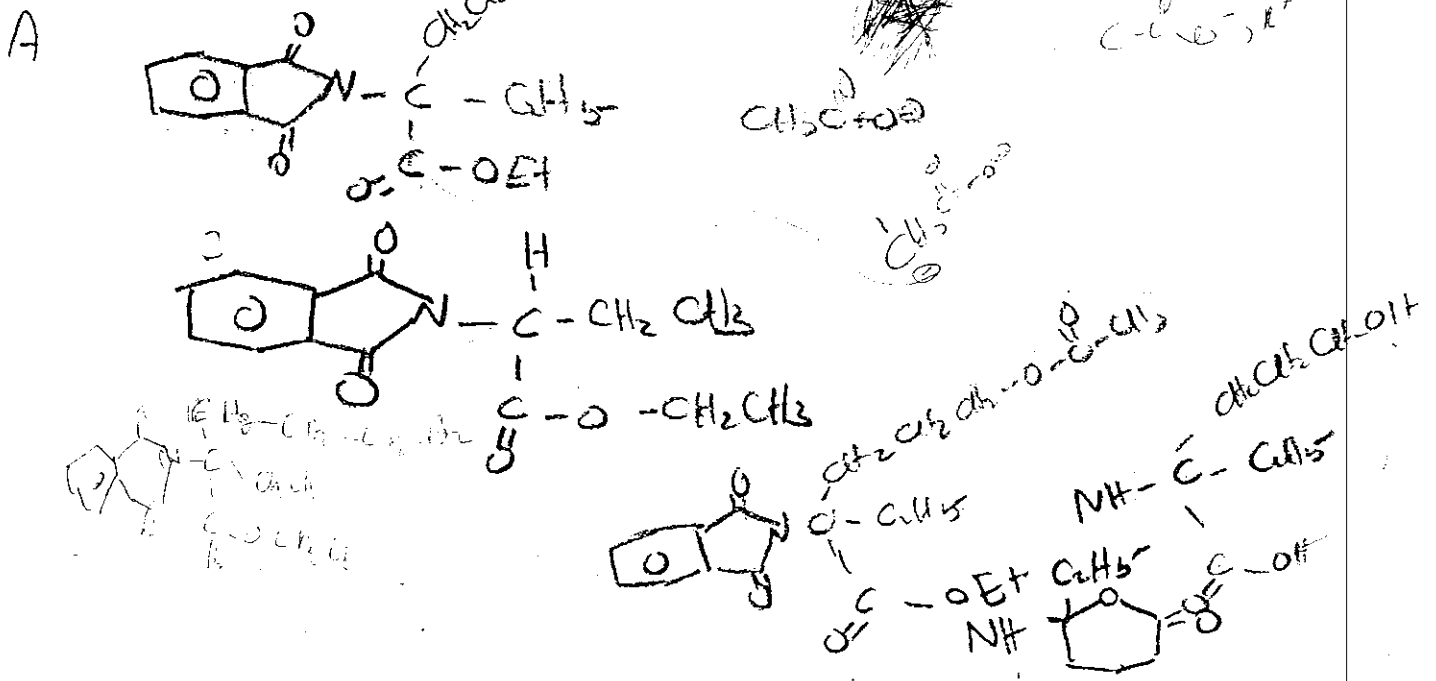
Handwritten notes: $5 C_s$ 12 H 5 5 o. 8



VII (15pts) Give structures for all intermediates in the following synthesis:



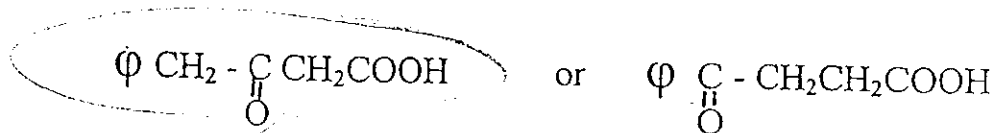
proline hydrochloride.



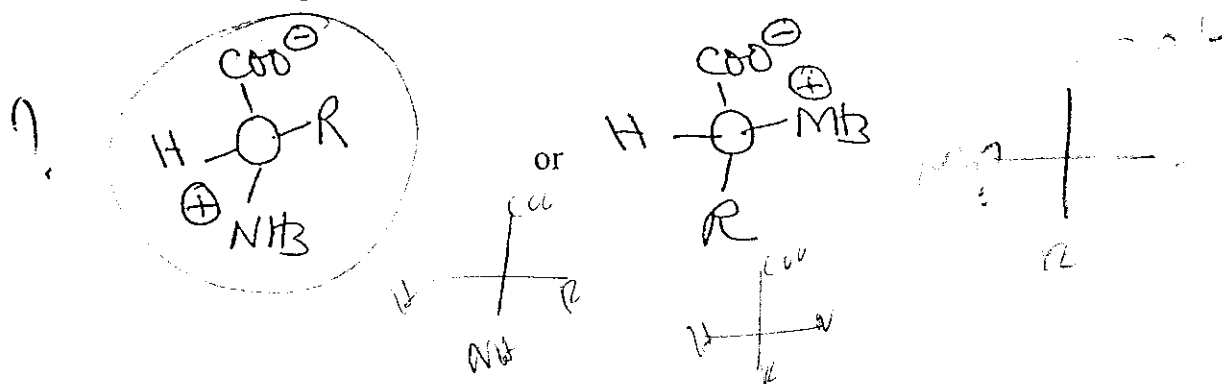
VIII (27pts)

a)

i) Which of the following acids would be easier to decarboxylate ?

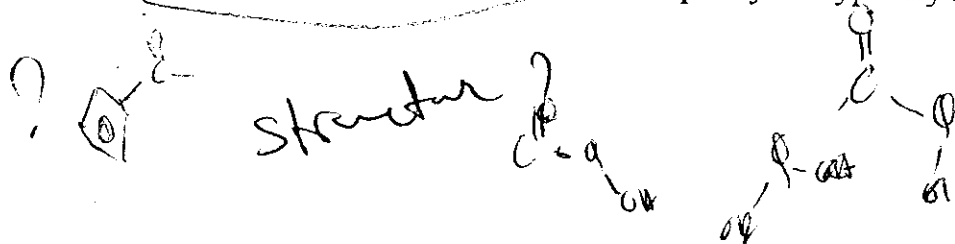


ii) Which of the following represents that of a naturally occurring α - amino acid ?



iii) Which of the following is steam distillable ?

o - hydroxyphenylketone or p - hydroxyphenylketone



b) Give the correct name of each of the following "Name Reactions"

i) The free titration of α - amino acids with standard bases .

L Sorenson Force

ii) The synthesis of an aldohexose from an aldopentose .

Miliani Fischer

iii) The synthesis of phenolic aldehydes from phenols .

Ram Kumar

iv) The oxidation of 1° and 2° alcohols using dimethylsulfoxide ,
oxalylchloride and triethylamine

Suvarn