

Time: 2 hrs

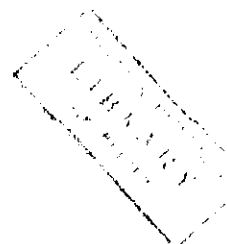
Chemistry 208
Final Exam

August 26, 1997
H. Deeb

Family Name: _____

First Name : _____

Student No. : _____



Grading

I /20

II /20

III /20

IV /18

V /08

VI /14

Total /100



I) Draw the structure of each of the following:

a- An aldohexose which yields optically inactive product upon oxidation with nitric acid.

b- Methyl- α -D-glucopyranoside using Haworth projection.

c- A disaccharide that shows negative test with Fehling's or Benedict's solution and name it.

d- A disaccharide that can show mutarotation and name it.

e- An optically inactive α -amino acid.

f- An α -amino acid with a basic side chain and name it.

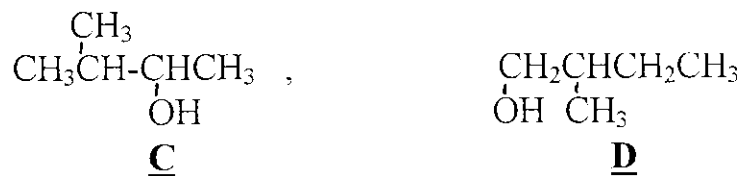
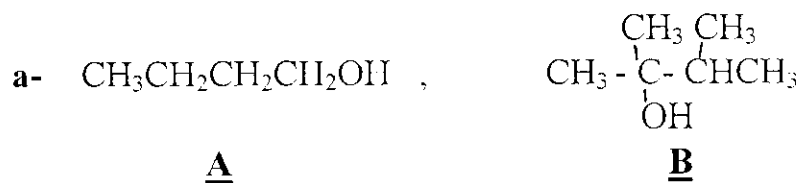
g- N-ethyl-p-toluamide.

h- The β -anomer of a compound that gives the same osazone as D-glucose.

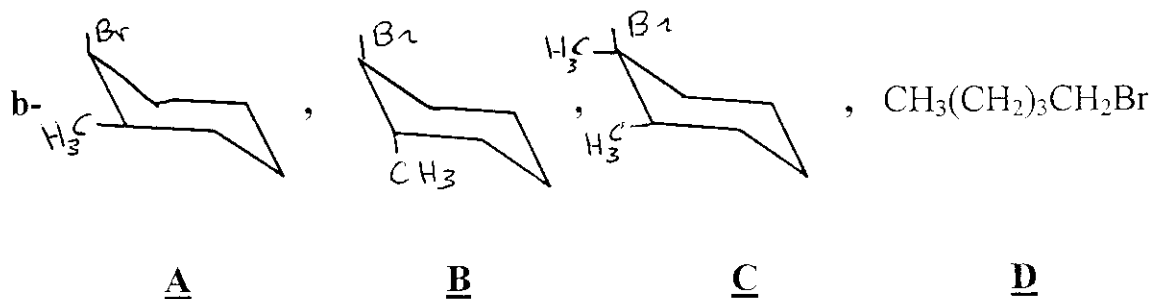
i- A compound that gives positive Br_2/CCl_4 test and a white precipitate when treated with NaNH_2 .

j- A compound that liberates N_2 gas upon treatment with nitrous acid.

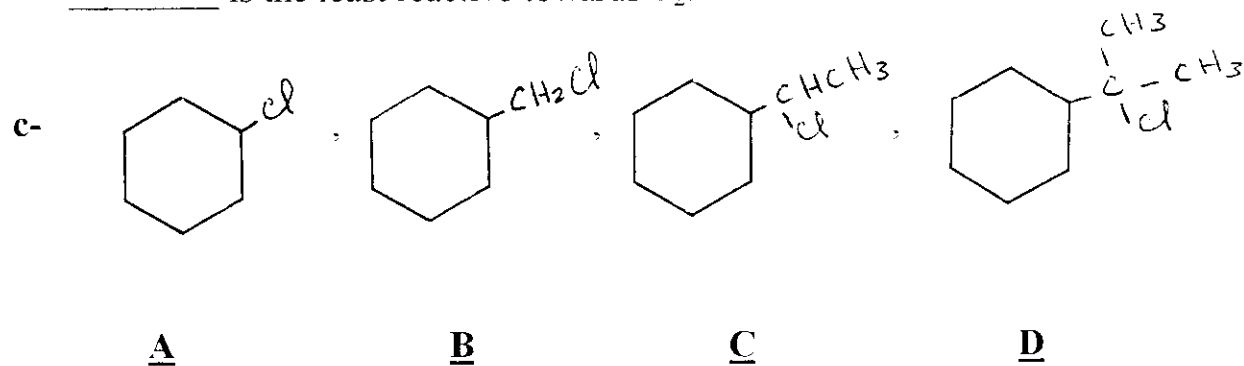
II) Fill the blanks of each of the following with the proper letter, after careful examination of the given structures.



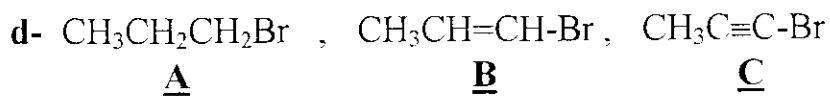
_____ is the most reactive towards dehydration.
 _____ is the least reactive towards dehydration.



_____ is the most reactive towards E_2 .
 _____ is the least reactive towards E_2 .



_____ is the most reactive towards SN^2 .
 _____ is the most reactive towards SN^2 .



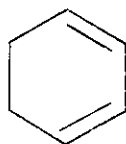
A

B

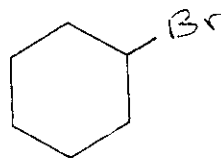
C

_____ has the strongest C-Br bond.
 _____ has the weakest C-Br bond.

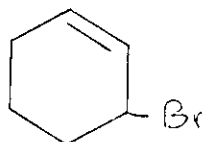
e-



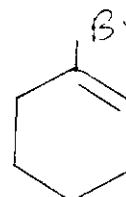
A



B

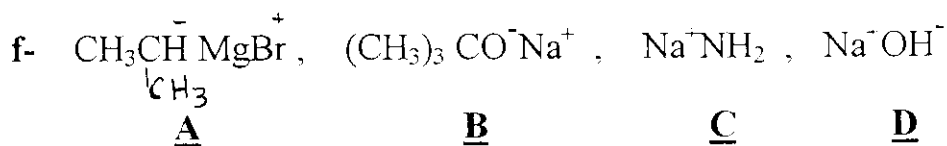


C



D

_____ is the most reactive towards dehydrohalogenation using a strong base.
 _____ is the least reactive towards dehydrohalogenation using a strong base.



A

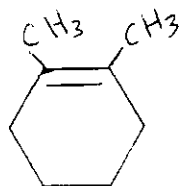
B

C

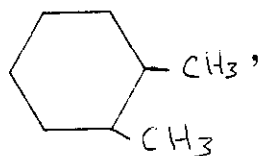
D

_____ is the strongest base.
 _____ is the weakest base.

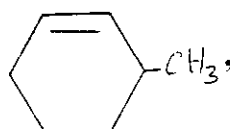
g-



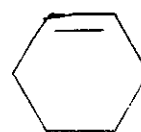
A



B



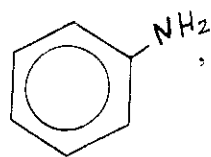
C



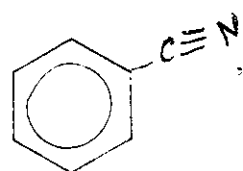
D

_____ can show both optical activity and cis-trans isomerism.
 _____ can show optical activity, but cannot show cis-trans isomerism.

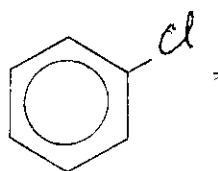
h-



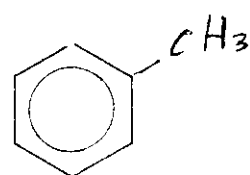
A



B



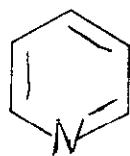
C



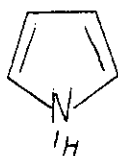
D

_____ is the most reactive towards electrophilic aromatic substitution.
_____ is the least reactive towards electrophilic aromatic substitution.

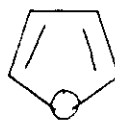
i-



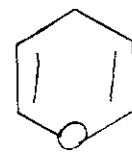
A



B

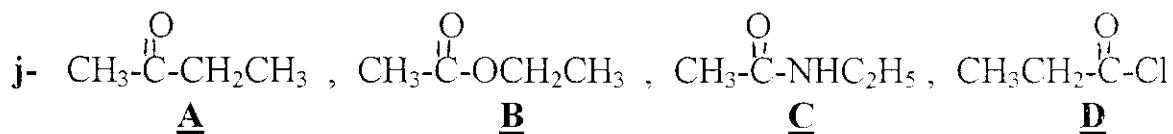


C



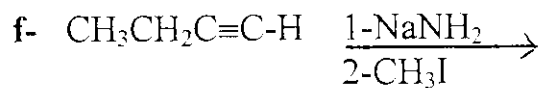
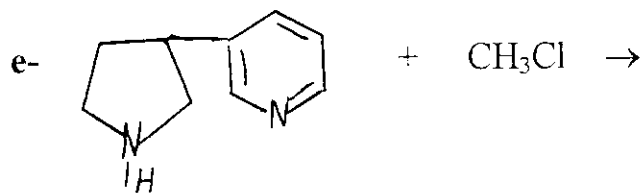
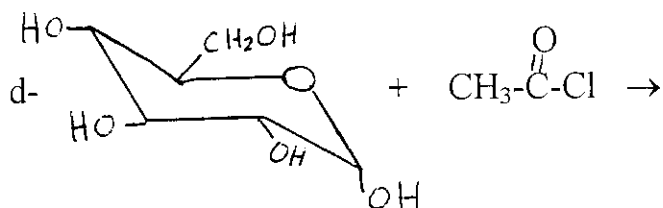
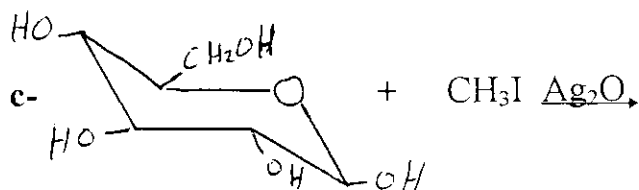
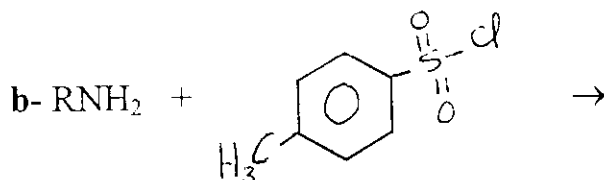
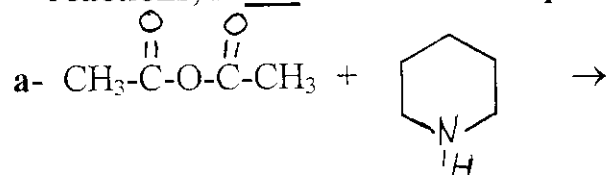
D

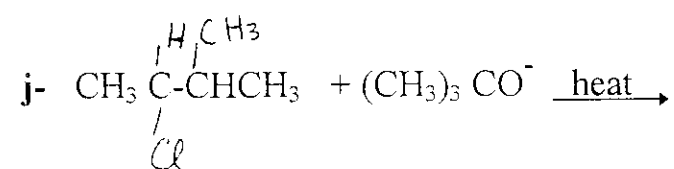
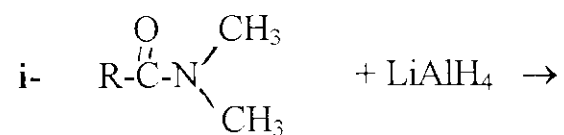
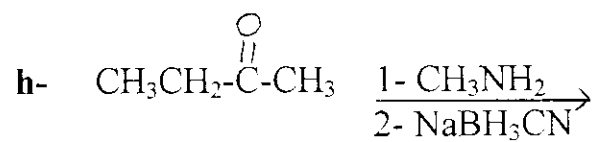
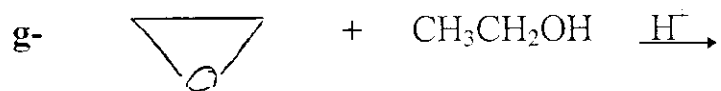
_____ is aromatic and can react with HCl .
_____ is not aromatic and can not react with HCl .



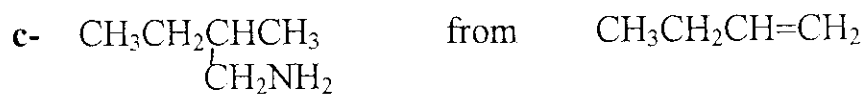
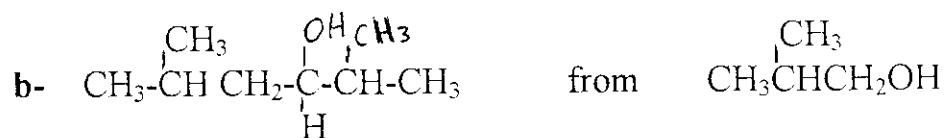
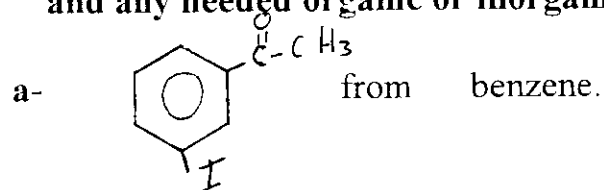
_____ is the most reactive towards hydrolysis.
_____ is the least reactive towards hydrolysis.

III) Predict the major organic product(s) of each of the following reactions, if **NO** reaction takes place, write "No Reaction".

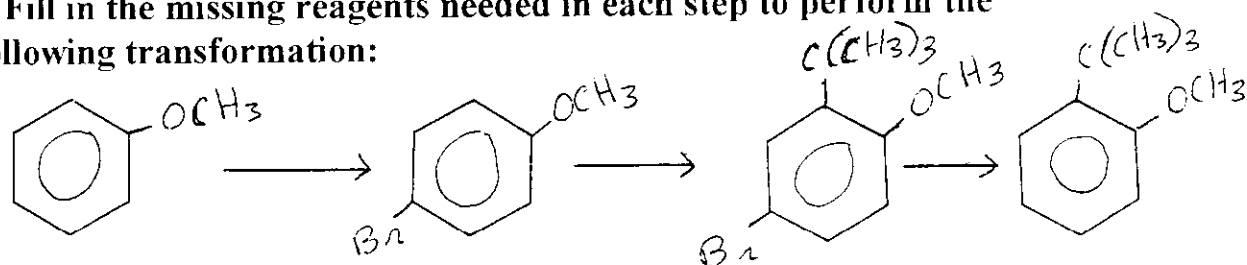




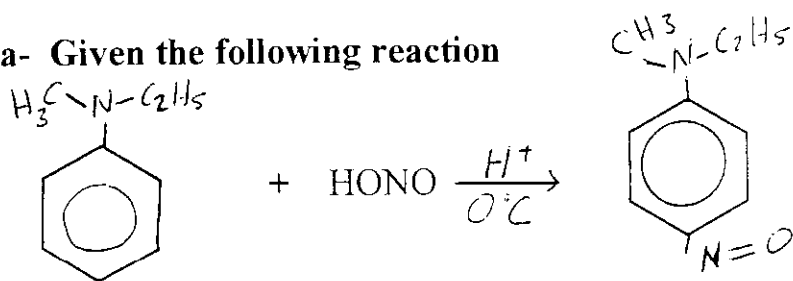
IV) Prepare each of the following from the indicated starting materials and any needed organic or inorganic reagents.



V) Fill in the missing reagents needed in each step to perform the following transformation:

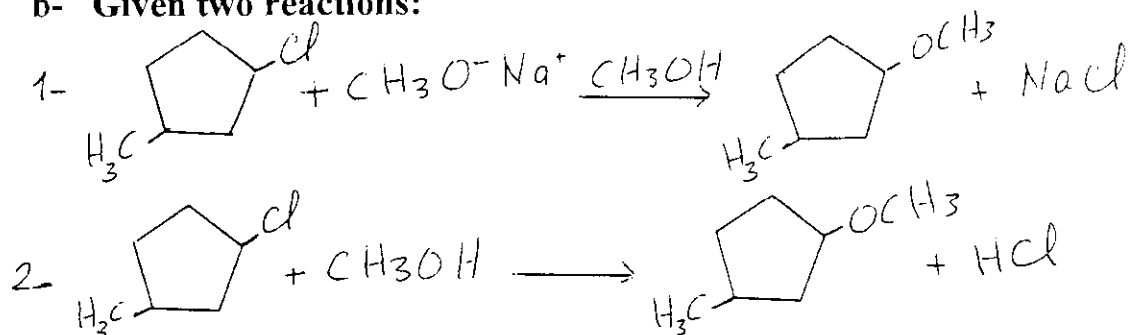


VI) a- Given the following reaction



Write a detailed mechanism for the above reaction and include all the resonance contributing structures for the intermediate, if applicable.

b- Given two reactions:



If the **R** enantiomer is used, it will lead to the **S** enantiomer in equation (1), and to both the **R & S** enantiomers in equation (2). Explain.