: 2hrs.

Chem. 208
Final Exam

Feb. 2, 2000
Mrs. Deeb
Mrs. Jaber

Family Name: _____

First Name: _____ _____

I.D. #: _____

Section: _____

Grading:

I. _____ / 32

II. _____ / 40

III. _____ / 20

IV. _____ / 24

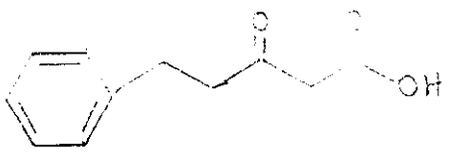
V. _____ / 24

VI. _____ / 60

Total : _____ / 200

GOOD LUCK

1 (32%) Give the structure or the name of each of the following compounds:

a- 

b- $CH_3\overset{\overset{O}{\|}}{C}-NH(C_2H_5)_2$

c- Isopropyl–p–chlorobenzoate

d- methyl–α–D–fructofuranoside

e- 4–O–(β–D–glucopyranosyl) –α–D–glucopyranose

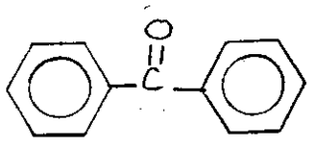
2- D–Threose and D–erythrose are both aldotetroses and epimers at carbon #2. Upon oxidation with nitric acid D–threose gave an optically active product and D–erthrose gave an optically inactive product.

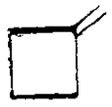
a- Deduce the structure of D–threose and D–erythrose.

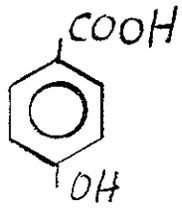
b- Draw the most stable Newman Projection for the optically inactive product of part(a)viewed along (C_2–C_3).

II(40%)

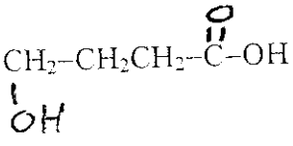
Predict the structure of the final major organic product(s) in each of the following?

a-  $\xrightarrow[2.\ H_3O^-]{1.\ Na^+\ \bar{C}\equiv CH}$

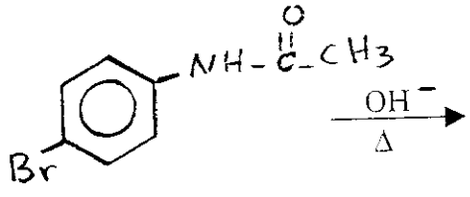
b-  $\xrightarrow[2.\ H_2O_2,\ OH^-]{1.\ B_2H_6}$

c-  + $CH_3C(=O)-O-C(=O)-CH_3$ $\xrightarrow{H^+}$

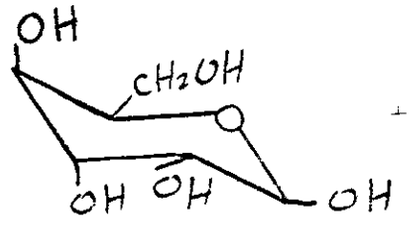
d-  + HBr(excess) $\xrightarrow{\Delta}$

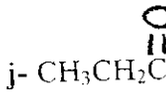
e- 

f- $(CH_3)_3CCl$ + $Na^+\ \bar{O}CH_2CH_3$ $\longrightarrow$

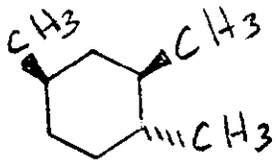
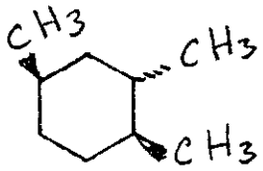
g- 

h- D–glucose + $NaBH_4$ $\longrightarrow$

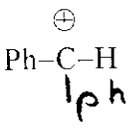
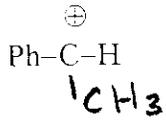
i-  + CH_3CH_2OH $\xrightarrow{H^+}$

j-  + $\xrightarrow[2.\ H_3O^-]{1.\ PhMgBr(exess)}$

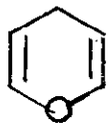
III-(20%) Circle the more stable structure in each of the following pairs. Explain briefly.

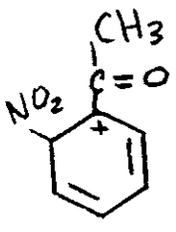
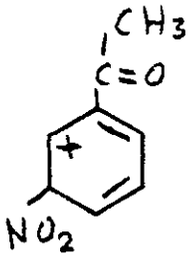
-  , 

(hint: draw chair conformations)

-  , 

- $(CH_3)_3CO^{\ominus}$, $(CH_3)_3C^{\ominus}$

-  , 

-  , 

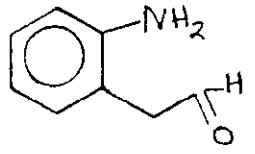
IV-(24%) Identify the structures of compounds A to C in each of the following:

1- (Aldehyde) A $\xrightarrow[2.\ H^+]{1.\ CH_3CH_2MgBr}$ $(C_6H_{14}O)$ B $\xrightarrow{\text{conc. } H^+}$ (C_6H_{12}) C $\xrightarrow[2-\ Zn,\ H_2O]{1-\ O_3}$ $CH_3CH_2-\overset{O}{\overset{\|}{C}}-H$ + $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$

A: _____

B: _____

C: _____

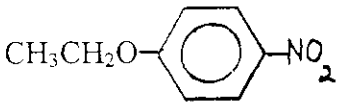
2-  $\xrightarrow{1.\ CrO_3,\ H^+}$ A $\xrightarrow{2.\ SOCl_2}$ B $\xrightarrow{3.\ \ \Delta}$ $C(C_8H_7NO)$

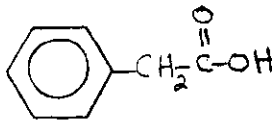
A: _____

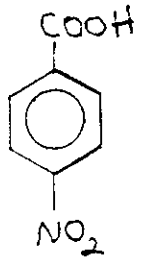
B: _____

C: _____

V-(24%) Outline all the steps in the synthesis of each of the following compounds from the given starting material and any needed organic or inorganic reagents.
Note: Choose any two.

1-  from phenol

2-  from Benzyl bromide

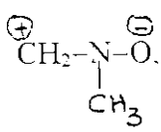
3-  from Benzene

VI(60%) Circle the letter that precedes the correct answer. There is only one correct answer. No double penalty for wrong answers.

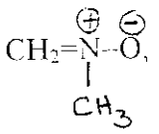
* **Which of the following compounds has the highest boiling point?**

a- Pentanol
b- pentanoic acid
c- cyclohexanone
d- Ethylacetate

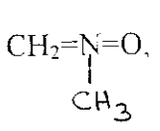
* **Which of the following four structures is not a permissable resonance form?**



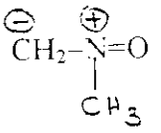
A



B



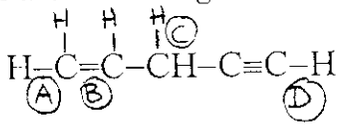
C



D

a- A
b- B
c- C
d- D

* **Which of the labeled sigma bonds in the following structure is the shortest bond:**



a- A
b- B
c- C
d- D

* **Which of the following has the highest heat of hydrogenation?**

a- $CH_2=CH-CH=CH_2$

b- 

c- 

d- $CH_2=CH-CH=CH-CH=CH_2$

* **Acid catalyzed hydration of 1-butene yields:**

a- A Racemic mixture
b- An optically inactive product
c- A product in the meso form
d- One stereoisomer

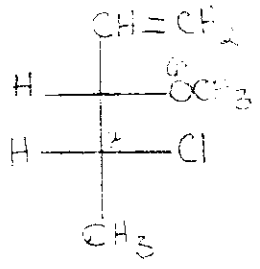
* **Which of the following compounds would undergo S_N2 most rapidly?**

a- 1-chloropentane
b- 2-chloropentane
c- chlorocyclopentane
d- 2-chloro-2-methylbutane

* **Which compound would undergo E_1 reaction the fastest:**

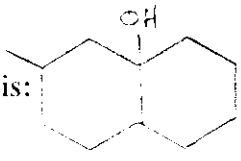
a- 1-chloropentane
b- 2-chloropentane
c- 2-chloro-2-methylbutane
d- 2-chloro-2,3-dimethylbutane

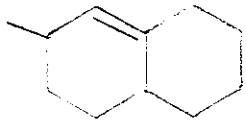
* **The correct complete IUPAC name of the following compound is:**

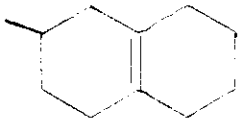


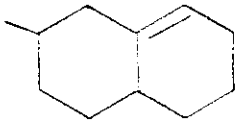
a- (3R,4S)–4–chloro–3methoxypentene
b- (3S,4R)–4–chloro–3–methoxypentene
c- (3R,4R)–4–chloro–3–methoxypentene
d- (2R,3S)–2–chloro–3–methoxy–4–pentene

* **The major dehydration product of the following alcohol is:**



a- 

b- 

c- 

d- **None of the above**

* **The main type of reaction that carboxylic acid derivatives can undergo is:**

a- Nucleophilic addition
b- Electrophilic substitution
c- Nucleophilic Acyl substitution
d- Elimination

* Which of the following is the most reactive towards CH_3CH_2MgBr?

a- 2-butanone
b- butanal
c- Ethylpropanaote
d- Propanamide

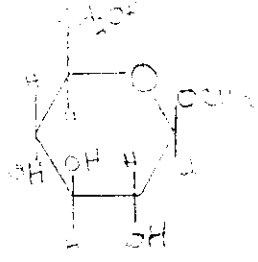
* Which of the following is the most reactive towards hydrolysis?

a- Ethylbenzoate
b- Benzoylchloride
c- Benzoic anhydride
d- Benzamide

* Which of the following is the most basic?

a- aniline
b- acetanilide
c- CH_3CN
d- CH_3NH_2

* Which statement regarding the following structure is true:



a- It is a hemiacetal
b- It is an acetal
c- It can show mutarotation
d- It gives a positive Tollen's test

* Which of the following structures is the most acidic?

A B C D

a- A
b- B
c- C
d- D