

M. Nazer

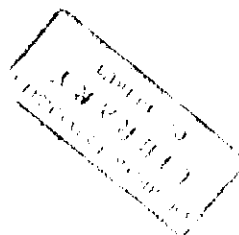
Chemistry 212
Final Exam

June 23, 1997
Time: 2.5 hrs

Name (Family First): _____

Student Number : _____

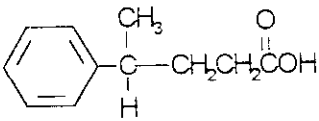
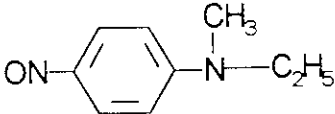
Section : _____



Grade

Question I :	Out of 10
Question II :	Out of 10
Question III :	Out of 18
Question IV :	Out of 12
Question V :	Out of 08
Question VI :	Out of 08
Question VII:	Out of 10
Question VIII:	Out of 08
Question IX :	Out of 09
Question X :	Out of 07
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Total :	Out of 100

I. (10 points). Give the corresponding name or structure in the provided space:

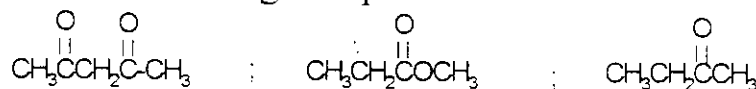
Structure	Name
$\text{CH}_3\text{CH}_2\text{CH}_2\underset{\text{C}_2\text{H}_5}{\overset{\text{O}}{\parallel}}\text{CCH}_3$	
	Methyl- β -D-glucoside
$\text{CH}_3\overset{\text{O}}{\parallel}{\text{C}}-\text{N}(\text{CH}_3)_2$	
	Isopropylbenzoate
$\text{CH}_3\overset{\text{O}}{\parallel}{\text{C}}\text{CH}_2\overset{\text{O}}{\parallel}{\text{C}}\text{OC}_2\text{H}_5$	
	Glycylglycine
	
	Isoprene
	
	p-Toluene-sulfonamide

II. (10 points). In each of the following sets circle the compound that fits the given information.

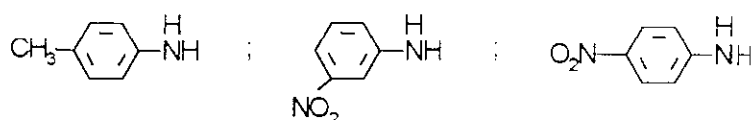
a) The compound that does not dissolve in cold aqueous NaOH:



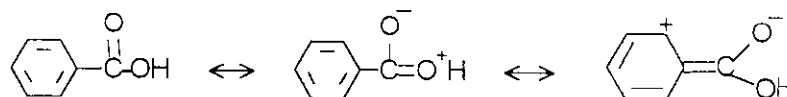
b) The acid that has the highest pKa :



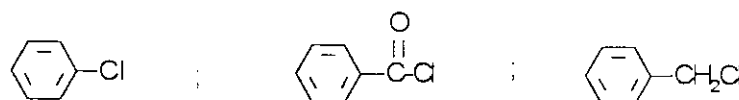
c) The weakest base :



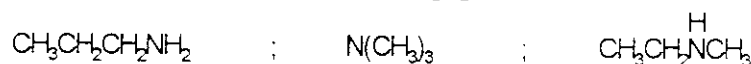
d) The least contributing resonance structure :



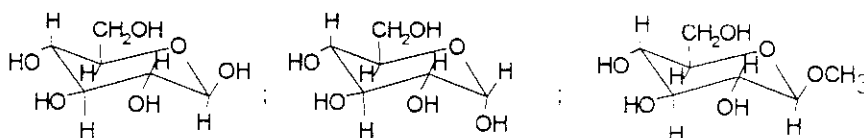
e) The most reactive towards NaOH :



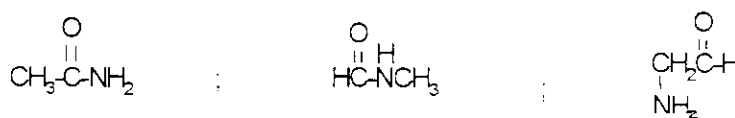
f) The one that has the lowest boiling point :



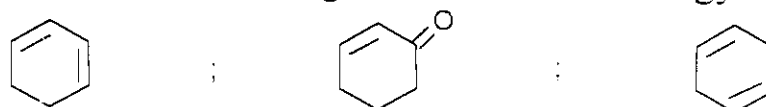
g) The one that when dissolved in water will not be oxidized by $\text{Br}_2/\text{H}_2\text{O}$:



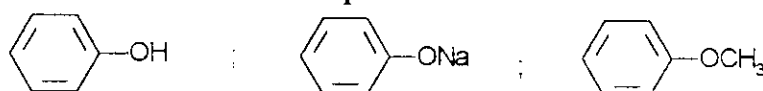
h) The one that gives nitrogen gas when treated with NaNO_2/HCl :



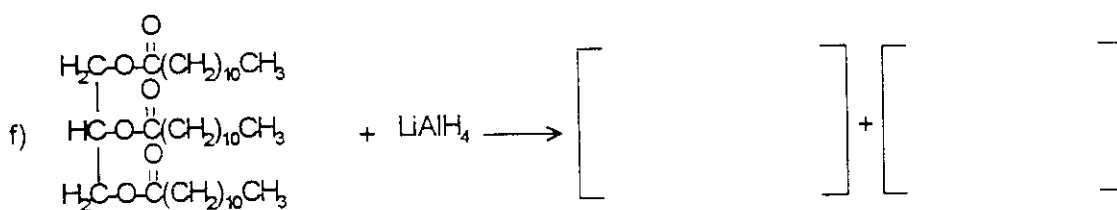
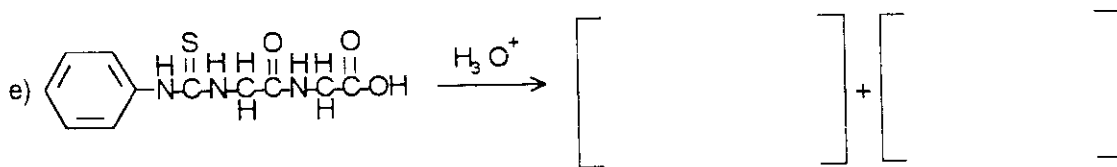
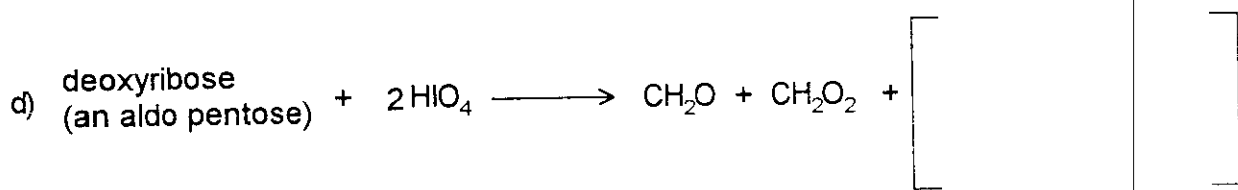
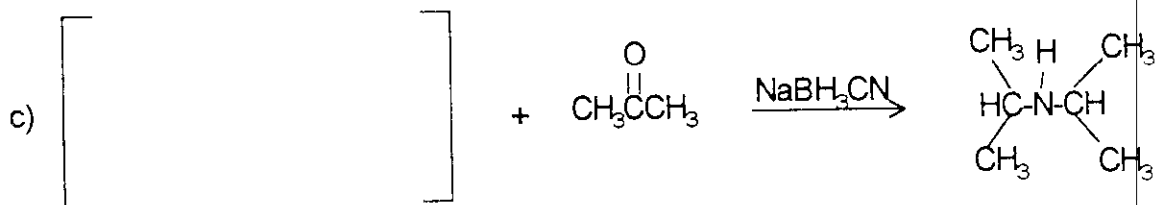
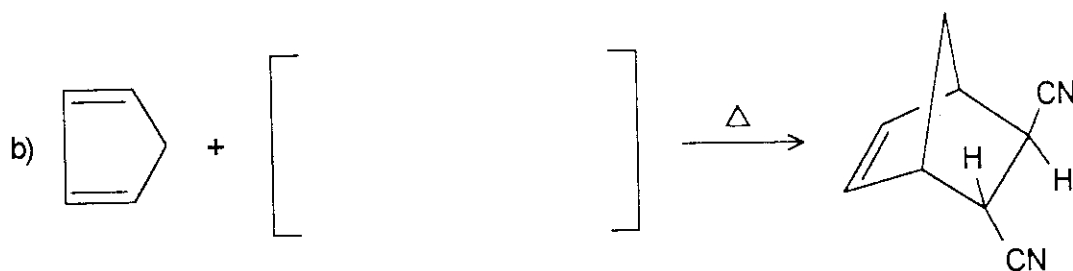
i) The one that absorbs UV light of the lowest energy :

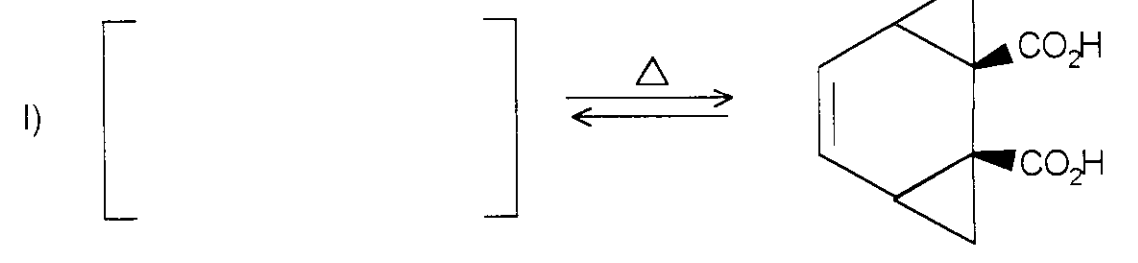
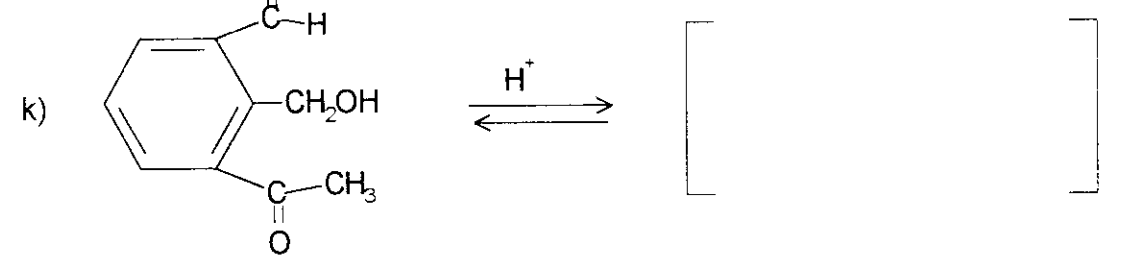
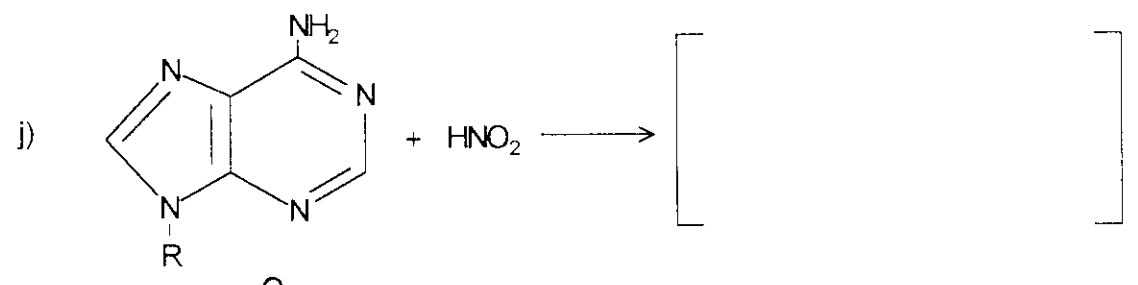
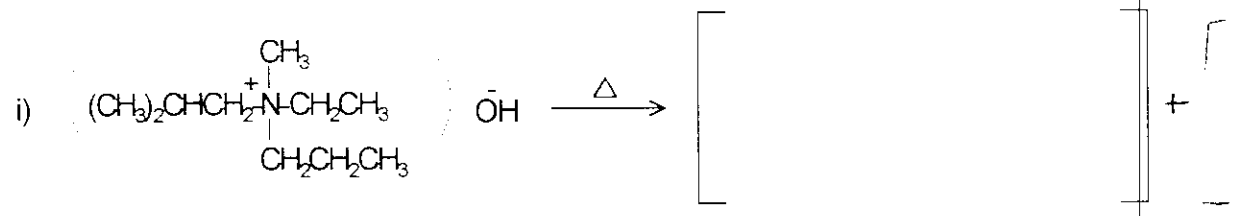
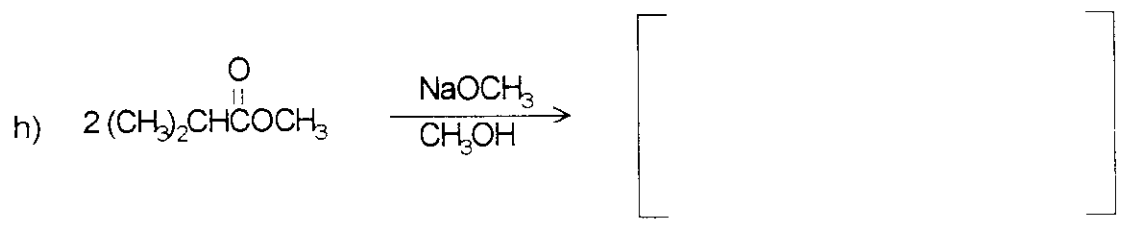
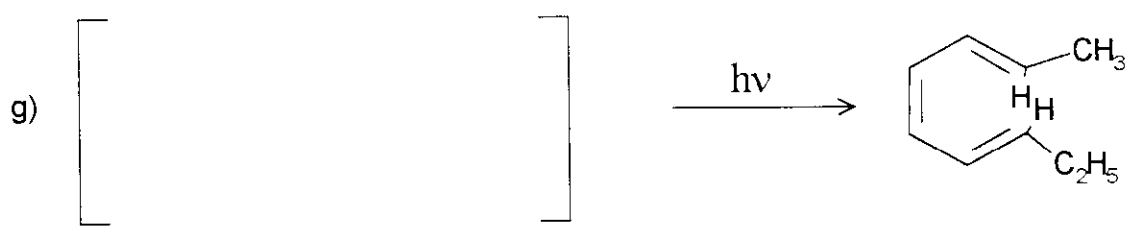


j) The most reactive in electrophilic aromatic substitution :

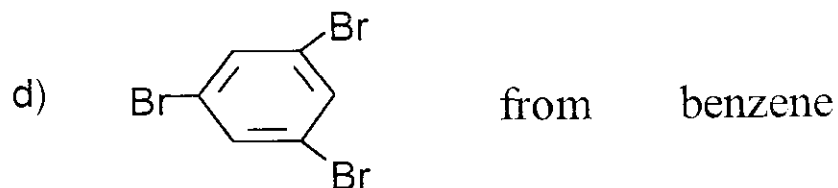
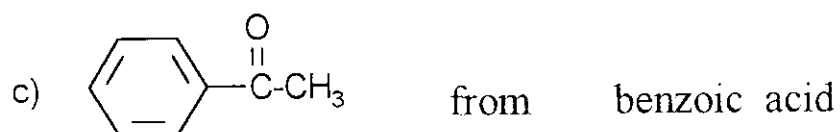
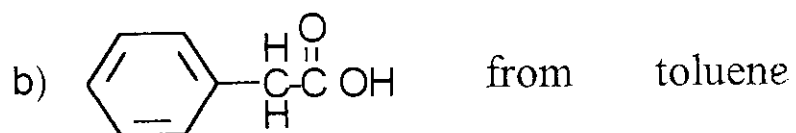
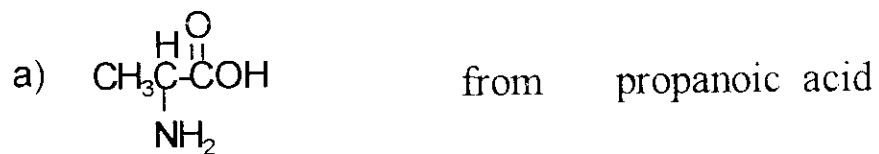


III. (18 points) . In each of the following reactions give, in the provided space [], the structure of the missing compound. In cases where more than one compound is produced, only the major or more important organic compound is given or asked for.



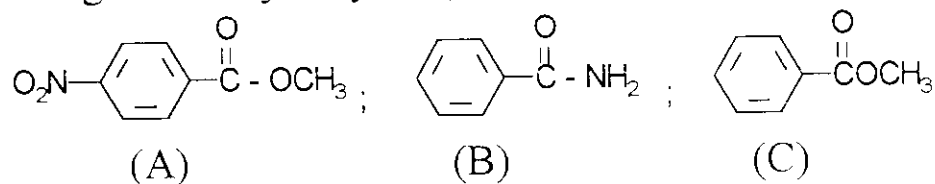


IV. (12 points). Starting from the specified compound and any other needed reagents write equations (no mechanisms) to show how each of the following could best be prepared.

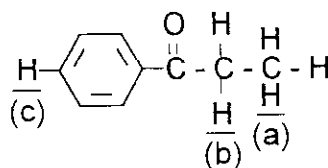


V. (8 points). Arrange each of the following in the order that is required.

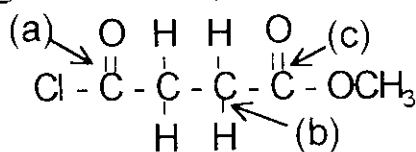
a) Increasing rate of hydrolysis. (i.e. slowest first).



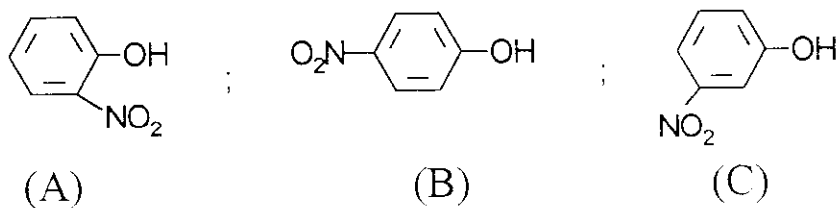
b) Decreasing δ (ppm) for the underlined atom in the NMR spectrum. (i.e. largest δ first).



c) Increasing wave length of IR light absorbed by the indicated bond in the stretching vibration. (i.e. shortest wavelength first).



d) Increasing order of boiling point. (i.e. lowest b.p. first).



VI.(8 points). In each of the following what structural features could be deduced from the given information.

a) A peptide that gives on partial hydrolysis the following dipeptides : Val-Ser , Ala-Val , Ser-Gly , Glu-Ala.

b) A monocyclic monoterpene.

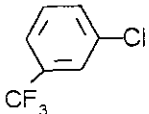
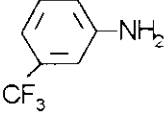
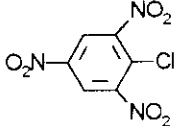
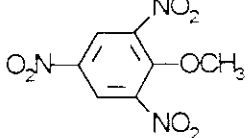
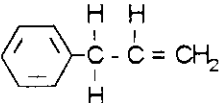
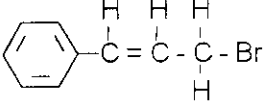
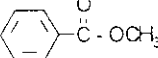
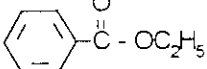
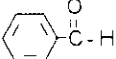
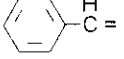
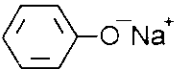
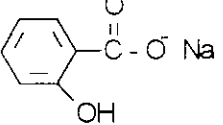
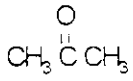
c) A non-reducing disaccharide which gives one aldohexose on hydrolysis.

d) An alcohol which gives an intense peak in the mass spectrum at $m/z = \text{M}^+$ 31.

VII.(10 points). The following table represents the reactions of several carbonyl compounds with the indicated reagent. Write the product(s) of each reaction in the provided spaces. Assume acid catalysis wherever needed.

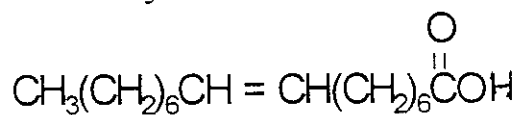
	$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{Cl}$	$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{H}$	$\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$
H_2O^{18}			
CH_3OH			
CH_3MgBr			
CH_3NH_2			
LiAlH_4			

VIII.(8 points). Each of the following reactions gives a key unstable intermediate which goes to the indicated product. Draw the structure of the corresponding intermediate in the provided space in the following table.

Reactants	Intermediate	Products
 + NaNH ₂		
 + NaOCH ₃		
CH ₃ NH ₂ + NaNO ₂ /HCl		CH ₃ OH + N ₂
 + NBS		
 + CH ₃ CH ₂ OH/H ⁺		 + CH ₃ OH
 + H ₂ C=P(Ph) ₃		 + (Ph) ₃ PO
 + CO ₂		
CH ₃ C≡CH + H ₂ O/H ⁺ /Hg ⁺⁺		

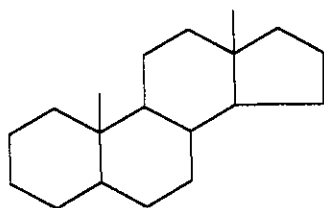
IX. (9 points).

a) Given the fatty acid:



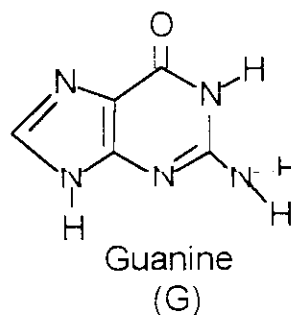
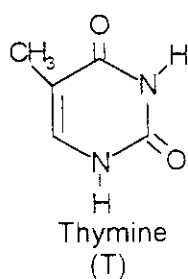
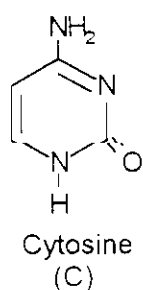
Draw the structure of an oil composed of this acid and glycerol. Also give a reaction that converts the oil to solid fat.

b) The following structure is common to steroids.



Place on the above drawing the following functional groups: $5\alpha\text{-H}$, $3\beta\text{-OH}$, 17-one .

c) Consider the following bases found in DNA:

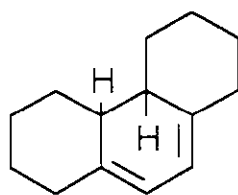


Choose the base(C or T) that compliments(G) (pairs with G) in DNA. Make a drawing to represent that pairing.

X. (7 points). Give a brief explanation for each of the following:

a) Glucose is the most stable monosaccharide .

b) Compound (A) is thermally stable but opens up to a triene when irradiated with UV light. Also draw the structure of the triene.



(A)

c) The following reaction cannot be a concerted pericyclic reaction.

