Mod. Ans.

University of Tanta
Faculty of Pharmacy
Depart. of Pharm. Chemistry
Pharm. Organic Chem. (2)
Final Exam
Second Semester, First Year
Time allowed: 120 min - Date: 31 - 5 - 2014

This Exam Booklet contains (9..) different pages

(50 Points for all)

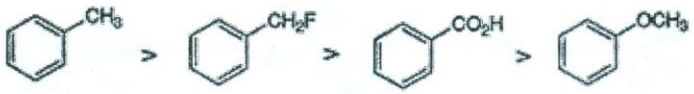
PART ONE (20 Points)

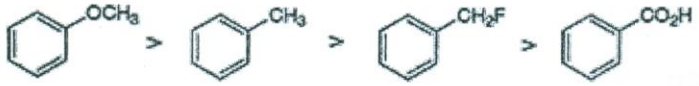
Q I # Multiple Choice Questions (6 Points)

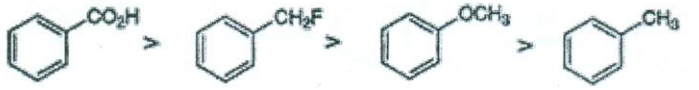
Choose the correct answer by filling in the whole area within the square.

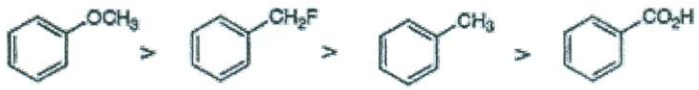
	A	b	c	d		a	b	c	d
1		■			7		■		
2		■			8			■	
3				■	9			■	
4	■				10	■			
5				■	11	■			
6			■		12		■		

1- Which is the correct order of reactivity toward electrophilic aromatic substitution?

a. 

b. 

c. 

d. 

11- Which of the following reagents could be used to distinguish between the following compounds by a <u>visible</u> reaction...one that produces either gas bubbles or a color change?

a- $KMnO_4$, H^+, cold

b- NaOH

c- CH_3MgBr

d- $LiAlH_4$

12- What is the best reagent to convert isopropyl alcohol to isopropyl bromide?

a- HBr

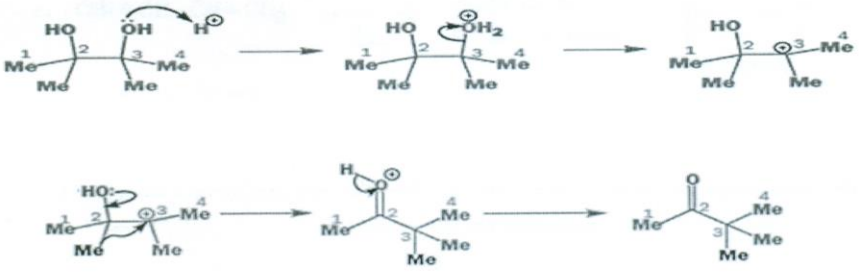
b- $SOBr_2$

c- Br_2

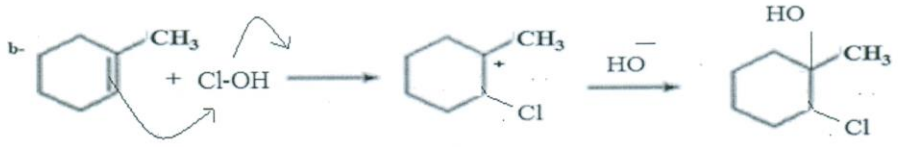
d- CH_3MgBr

13- By means chemical equation, give the mechanism of the following: (6 Points)

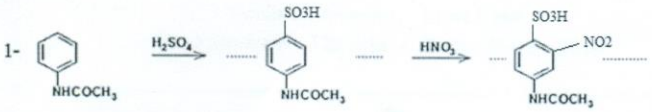
a- **Pinacol/Pinacolone rearrangement**



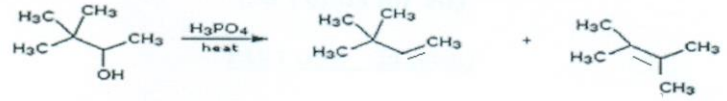
b-



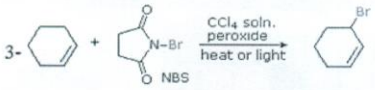
14- Complete the following: (8 Points)

1- 

.....

2- 

.....

3- 

.....

4- $CH_2 = CH - CH = CH_2 \xrightarrow[Br_2]{}$ $CH_2(Br) - CH(Br) - CH = CH_2$ (1,2-addition) + $CH_2(Br) - CH = CH - CH_2(Br)$ (1,4-addition)

.....

==========

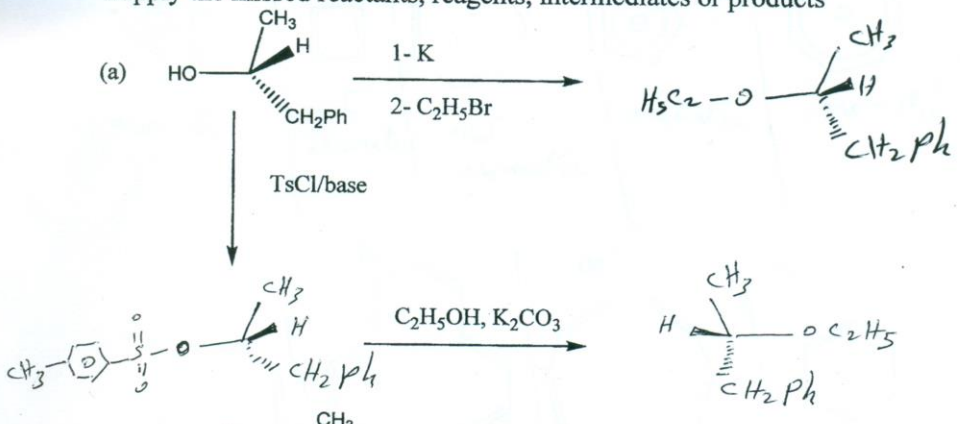
==========

6

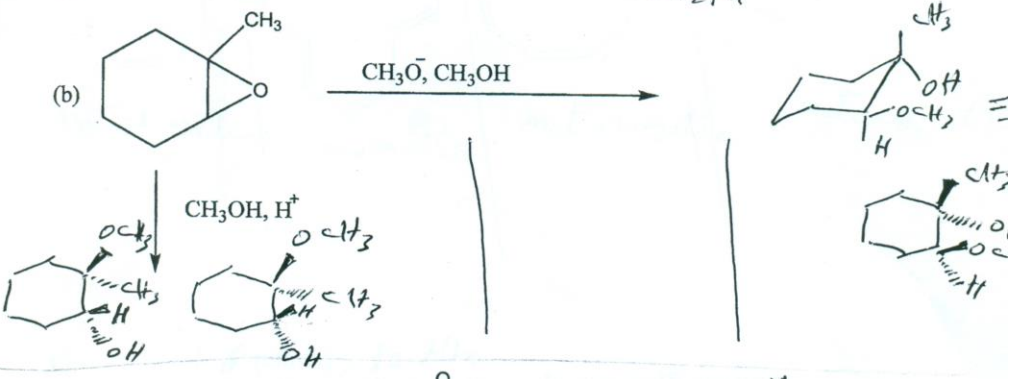
University of Tanta, 1st level Clinical Pharmacy, Organic Chemistry 2, May, 2014, p. 6 of
Part II (by K.Elberembally, Ph. D) 30 Points, 60 Min.

Q. 1 (4 points) 8 Min.
Supply the missed reactants, reagents, intermediates or products

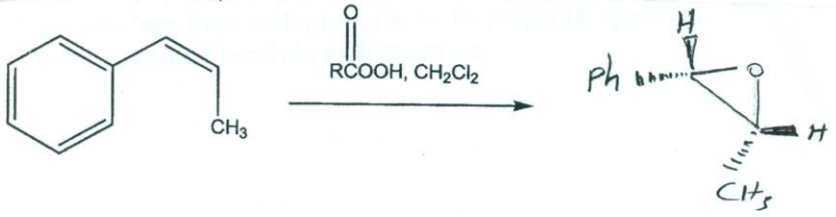
(a)



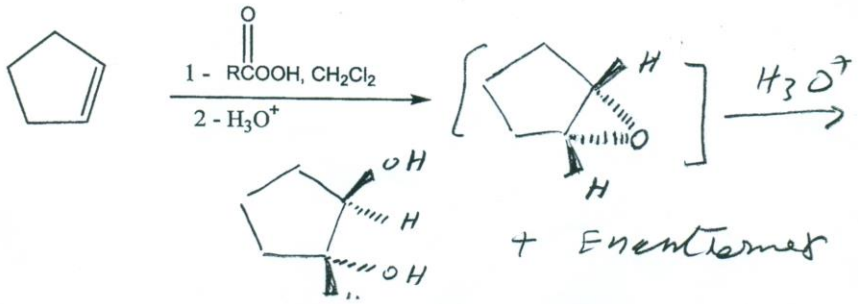
(b)



(c)

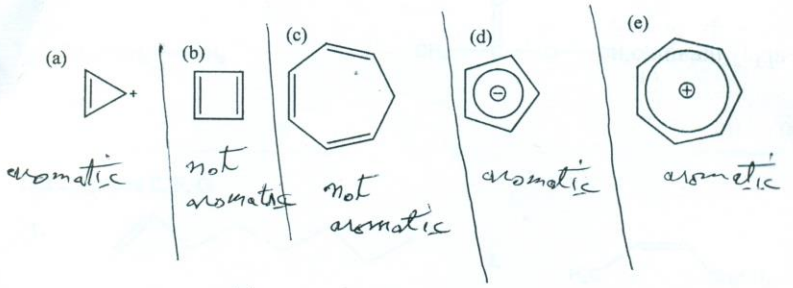


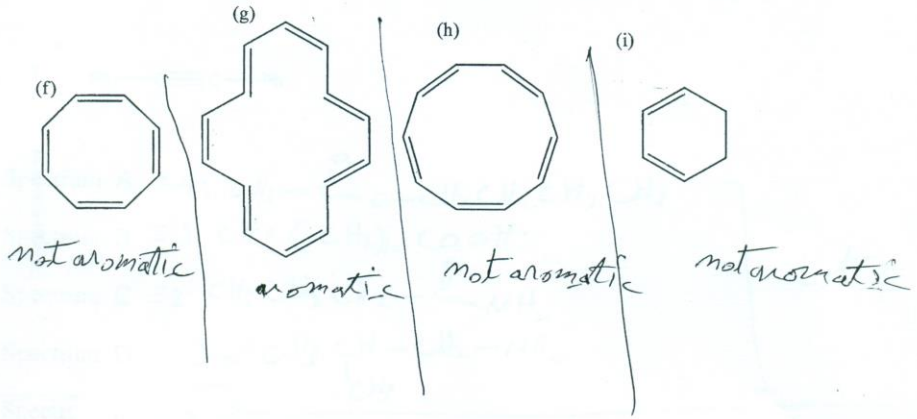
(d)



Q. 2 (3 points), 6 Min.

Which of the following molecules or ions is not aromatic according to Huckel's rule ?



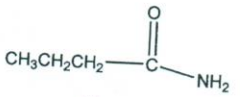


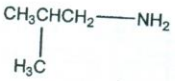
Q. 3 (6 points), 12 Min.

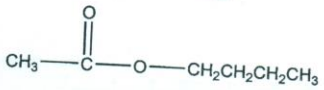
Match the structure from each given list to the proper IR spectrum.
Identify the diagnostic bands in each spectrum.

list 1, Spectra A, B, C, D

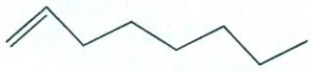
1. $CH_3(CH_2)_{10}COOH$

2. 

3. 

4. 

List 2, Spectra E, F, G

1. 

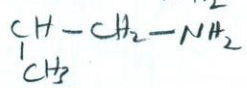
2. 

3. 

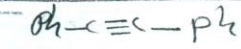
Spectrum A = 4; 

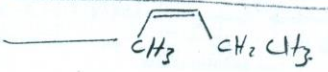
Spectrum B = 1 $CH_3(CH_2)_{10}COOH$

Spectrum C = 2 

Spectrum D = 3; 

List 1

Spectrum E = 3 

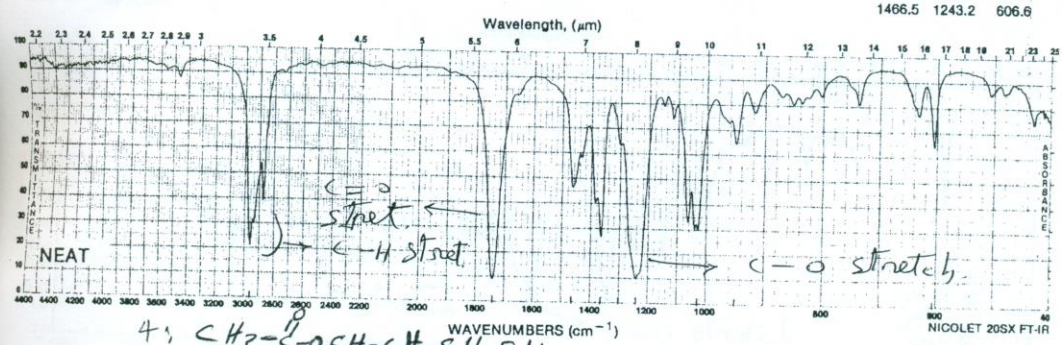
Spectrum F = 2 

Spectrum G = 1 

List 2

Problem **Spectrum** A

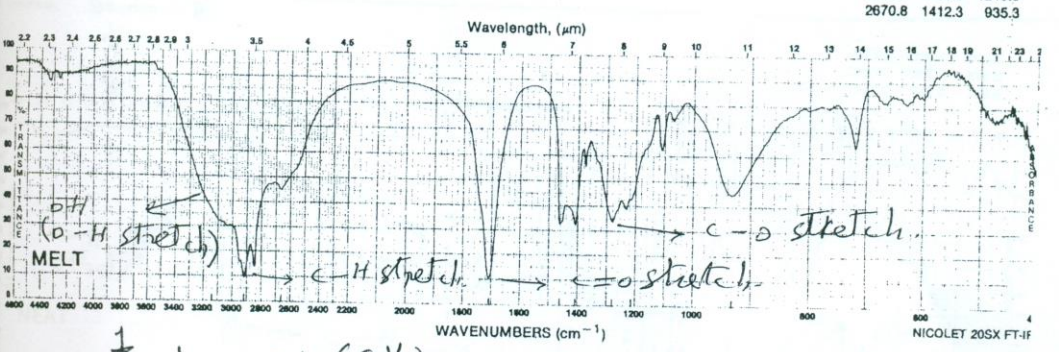
2962.1 1366.3 1031.3
1743.1 1303.6 950.8
1466.5 1243.2 606.6



4; $CH_3-\overset{O}{\overset{\|}{C}}-OCH_2CH_2CH_2CH_3$

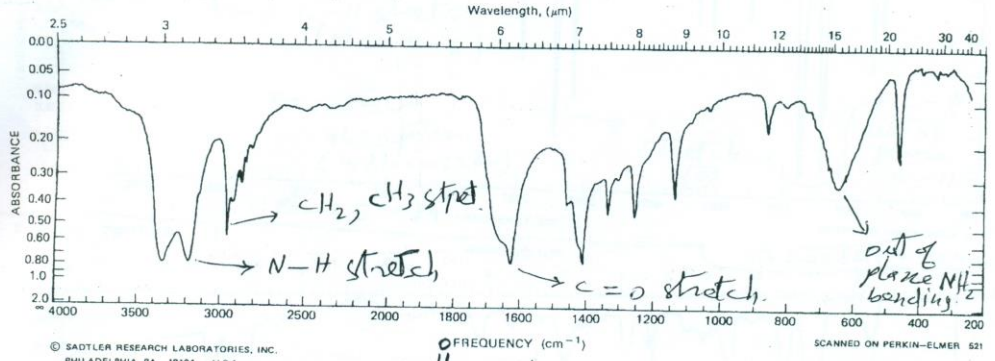
Problem **Spectrum** B

3148.2 1712.1 1285.0
2925.9 1466.3 1218.9
2670.8 1412.3 935.3



1 ; $CH_3(CH_2)_{10}COOH$

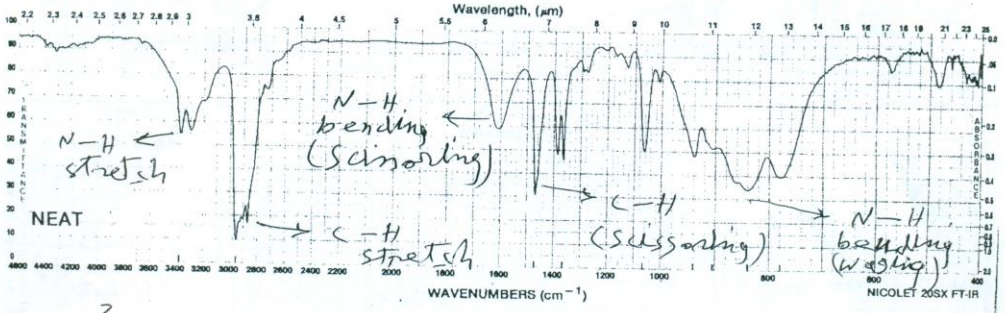
Problem **Spectrum** C



2 $CH_3CH_2CH_2\overset{O}{\overset{\|}{C}}-NH_2$

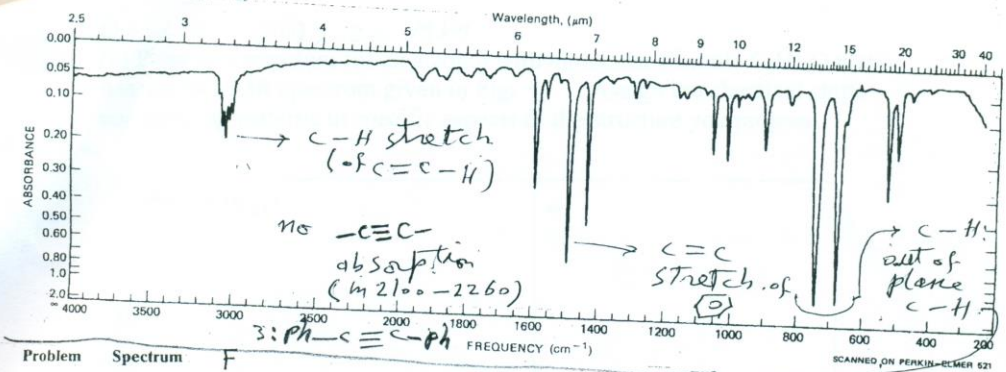
Problem **Spectrum** D

3375.8 1366.4 903.6
2955.6 1065.7 839.0
1470.0 939.6 778.0

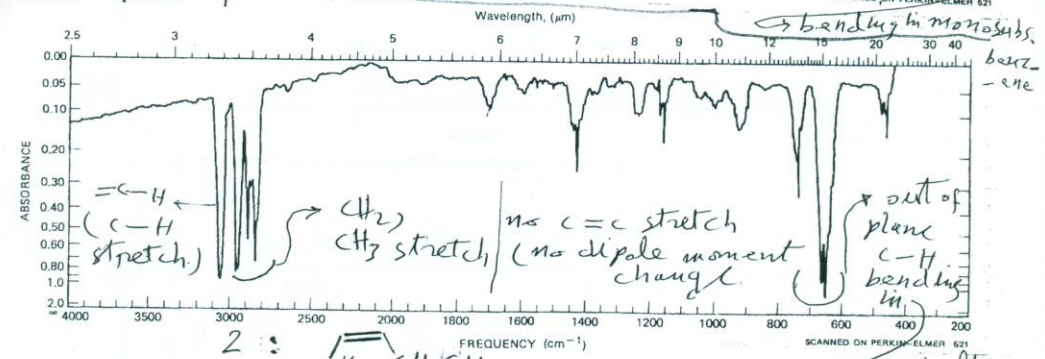


3 ≡ $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-NH_2$

Spectrum E



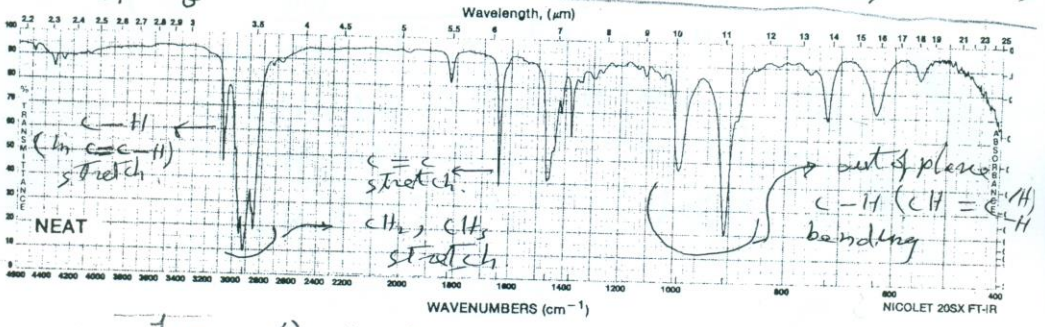
Problem Spectrum F



bending in monosubs. benzene

cis alkenes

spec. G



1 =

Q.4 (11 points), 22 Min.

(a) Propose a structure for an alcohol with molecular formula $C_5H_{12}O$ that has the ^1H NMR spectrum given in Fig. 1 . Assign the chemical shifts and splitting patterns to specific aspects of the structure you propose.

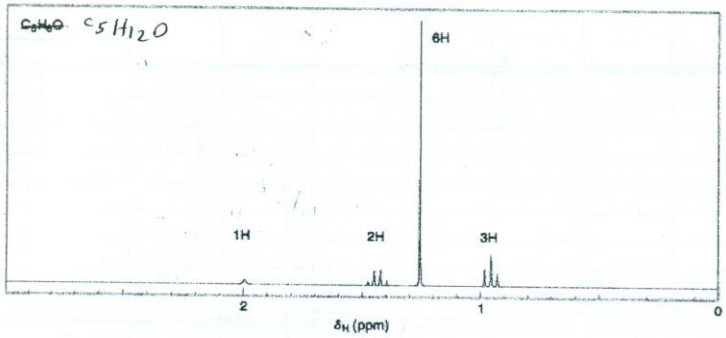
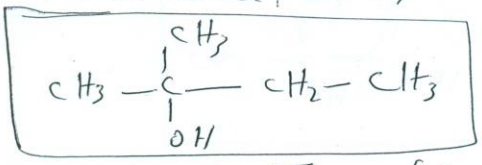


Figure 1 The ^1H NMR spectrum (simulated) of alcohol ~~C_6H_6O~~ $C_5H_{12}O$

The structure: The 3ry alcohol:



Broad peak at ≈ δ 2 : OH.

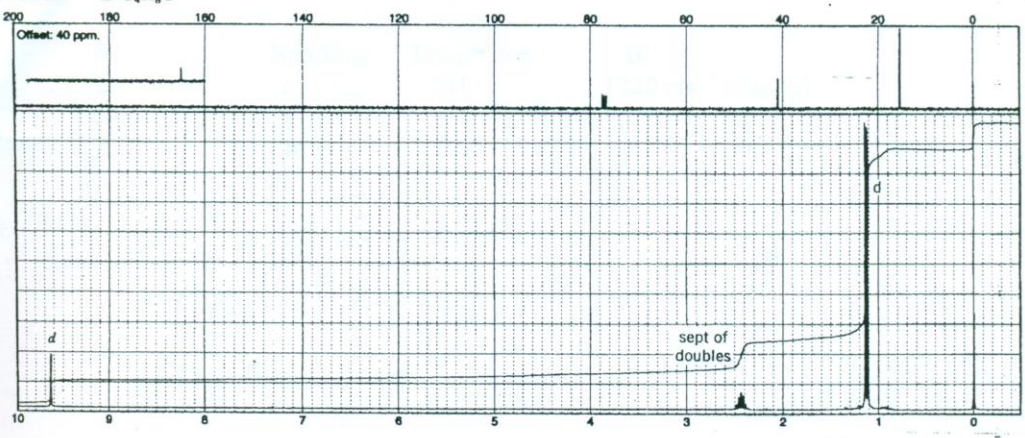
q, 2 H, δ 1.45; $-CH_2-$ (calc. 1.59)

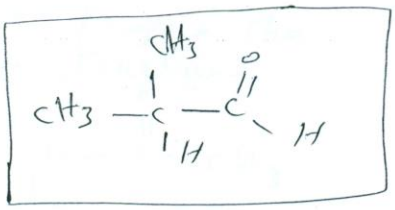
T, 3 H, δ 0.95 : CH_3. (calc. 1.25), CH_3

S, 6 H, δ 1.25 . 2 CH_3 (of $CH_3-\overset{|}{C}$), calc. δ 1.25

(b) Deduce the structure of the compound D from the 300 MHz proton spectra and assign all ^1H signals.

Problem D C_4H_8O





Q. 5 (6 points), 12 Min.

Propose a structure that is consistent with the following set of ^1H NMR data. IR data is provided for the same compound.

MF: $C_{15}H_{14}O$

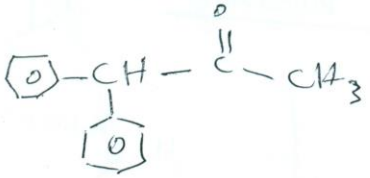
δ (ppm)	Splitting	Integration	IR
2.20	s	3H	1720 cm^{-1} (strong)
5.08	s	1H	
7.25	m	10H	

IR: may be a ketone

NMR (δ 2.20, S, 3H) → $-\overset{O}{\overset{\|}{C}}-CH_3$.

from MF → 

We can propose the following structure



δ 5.08, S, 1H : C-H

δ 7.25, m, 10H, 2

C_6H_5

C_2H_3O

C_8H_8O

Then we require

$C_{15}H_{14}O$

$- C_8H_8O$

C_7H_6

This may be