ESPOL POLYTECHNIC UNIVERSITY

FACULTY OF NATURAL SCIENCES AND MATHEMATICS

DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL SCIENCES

YEAR:	2019	**EVALUATION:**	Rubrica
COURSE:	ORGANIC CHEMISTRY II	**TEACHERS:**	PhD. HACI BAYKARA, PhD. JOAN VERA
		DATE:	AUGUST 26, 2019

HONOR COMMITMENT

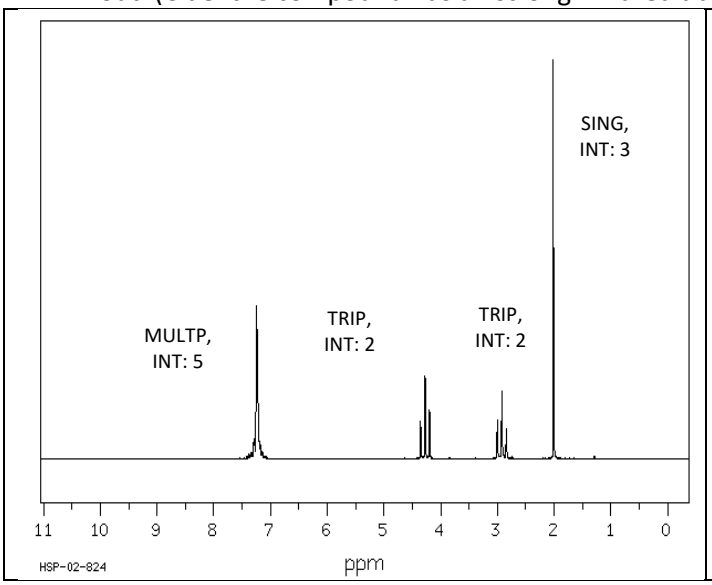
I, ... when signing this commitment, I acknowledge that the present exam is designed to be solved individually, that I can use an ordinary calculator for arithmetic calculations, a pen or pencil; that I can only communicate with the person responsible for receiving the exam; and, any communication instrument, I must turn it off and deposit it in the front of the room, along with some other material that is accompanying it. I should not also consult books, notes, or additional notes to those delivered in this evaluation. The topics I must develop in an orderly manner.

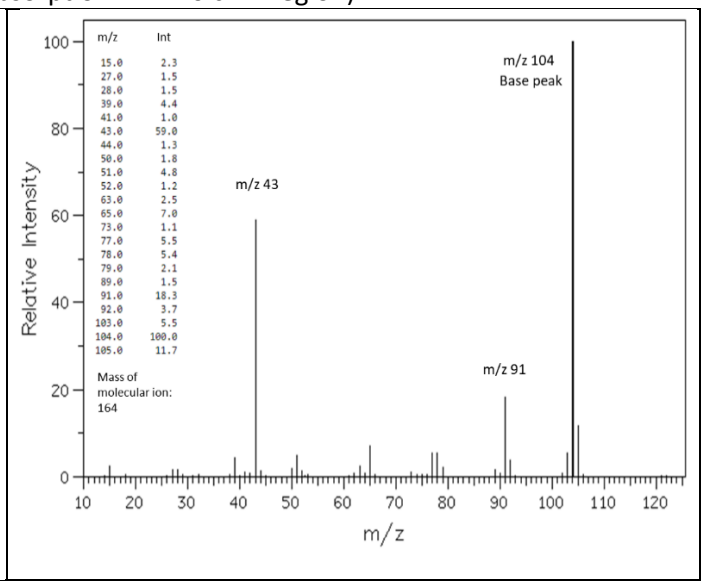
I sign this commitment, as proof of having read and accept the previous statement.

Signature NUMBER OF REGISTRATION: .... COURSE NUMBER: .....

Section I: Spectroscopy RMN and Mass. (25 points)

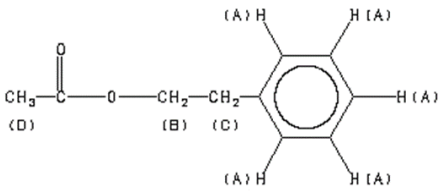
1. The following ^{1}H-RMN and MS spectra's are a compound of molecular formula $C_{10}H_{12}O_2$, Set a possible structure for these signals, assign these signals to the protons in the structure, explain the pointed fragments out. (Clue: the compound has an strong infrared absorption in 1740 cm^{-1} region).





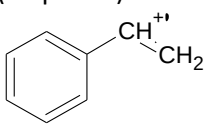
Infrared absorption: C=O, Esther

1H-NMR (15 points)

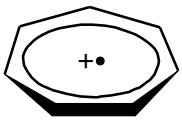


Assign.	Shift(ppm)
A	7.44 to 7.07
B	4.269
C	2.926
D	2.013

Mass spectra (10 points)



m/z 104



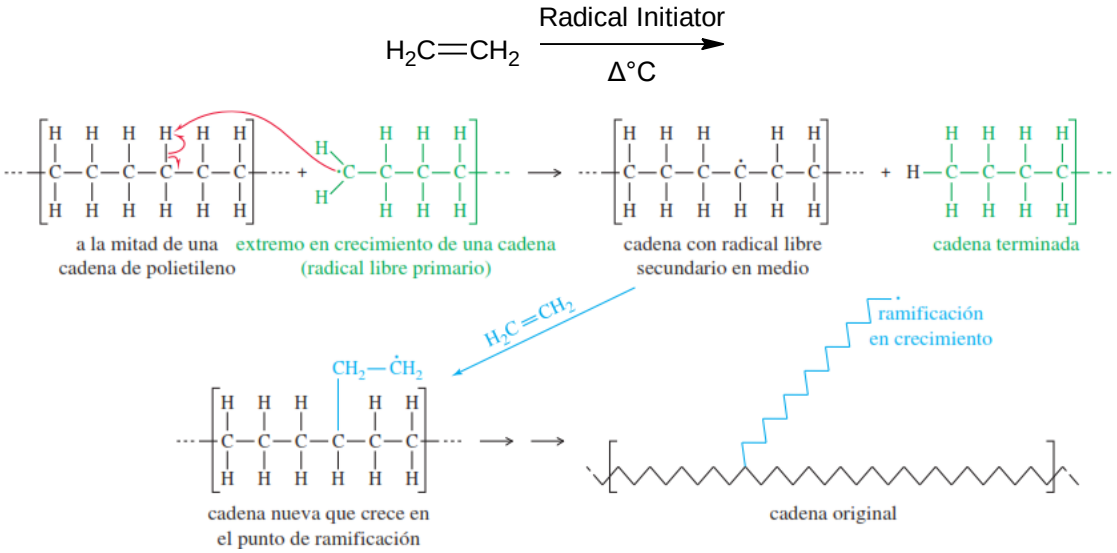
m/z 91

CH_3CO^{*+}

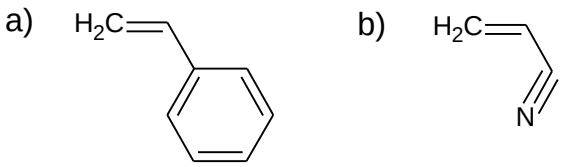
m/z 43

Section II Biomolecules and Polymers. (70 points)

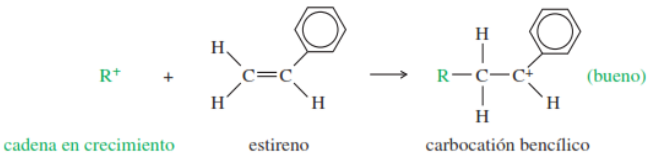
1. In the polymerization by free radicals, polyethylene (C_2H_4) present lateral ramifications, identify the phenomenon and proposes a simple mechanism, argue your answer. (15 points)



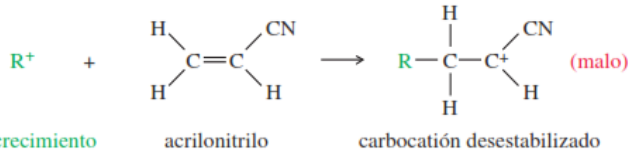
2. In the following monomers which in the cationic polymerization is the best, why? (10 points)



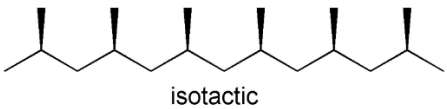
a) (5 points)



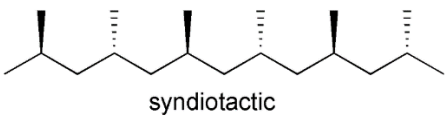
b) (5 points)



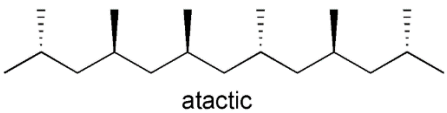
3. In the propylene polymerization (C_3H_6) using catalyst Ziegler-Natta the polymers stereochemistry can be controlled. Draw three known ordinations and stablished crystallinity differences about this structure. (10 points)



isotactic



syndiotactic

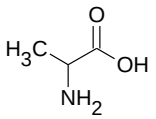


atactic

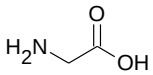
Crystallinity

Isotactic > Syndiotactic > Atactic

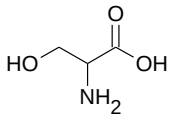
4. Polyamides like nylon have many applications in the industry. However, in nature are important polyamides for life, draw the amides polymer obtain crossing the followings amino acids in the sequence Ser-Gly-Ala-Gly (10 points)



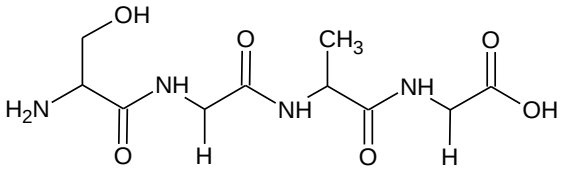
Alanine



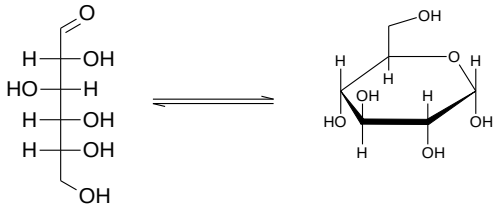
Glycine

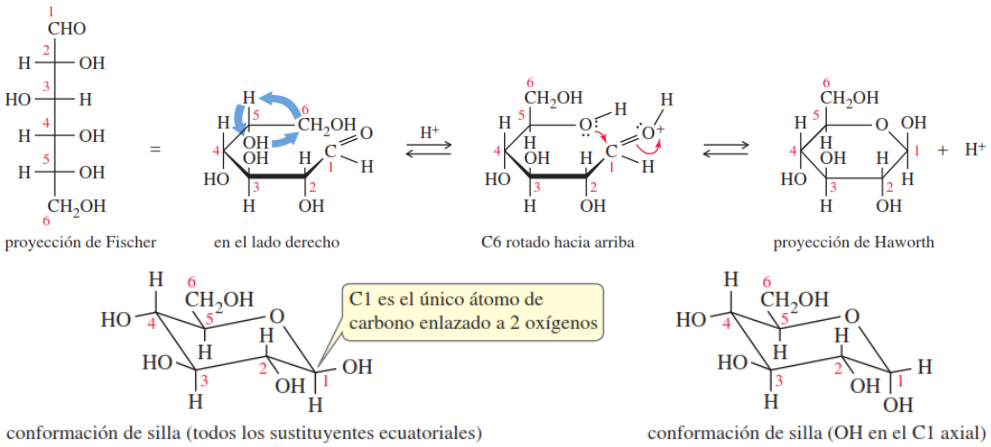


Serine

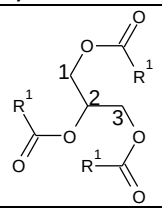
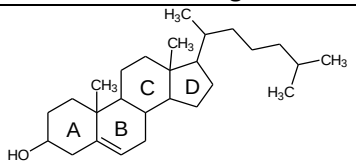
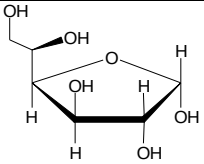
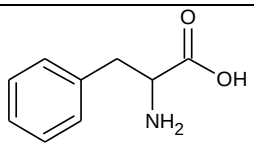


5. Draw the cyclization mechanism of glucose ($C_6H_{12}O_6$). (15 points)



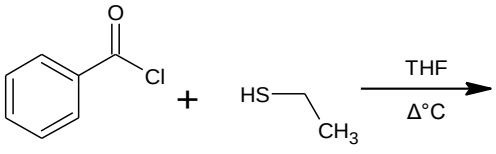


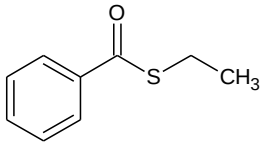
6. Identify the following biomolecules according to their structure: (10 points)

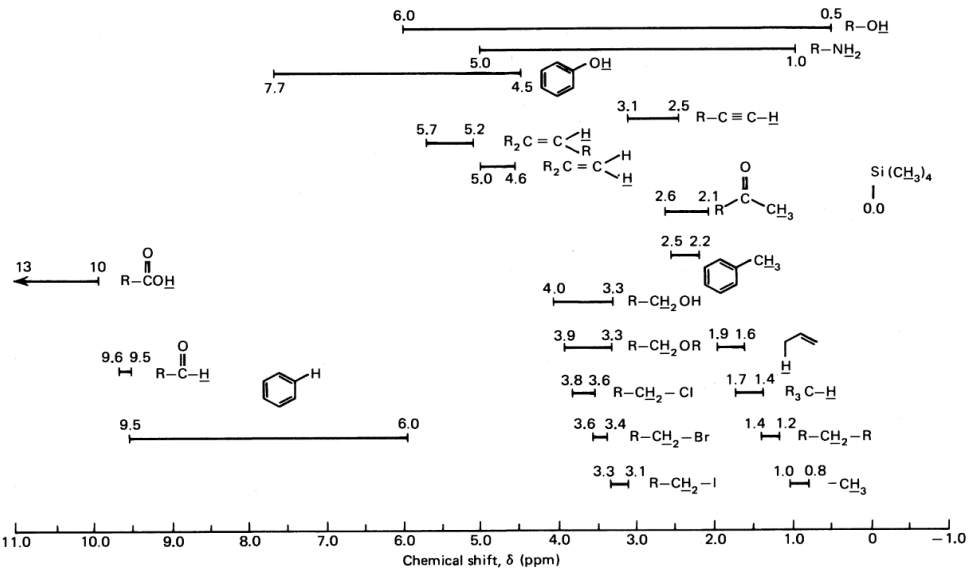
			
Triglyceride Complex lipid	Cholesterol Simple lipid	Glucofuranose Monosaccharide	Phenylalanine Amino acids

Section III. Esthers of inorganic acids (5 points)

1. Write the product obtained for the following reaction:






6.0
0.5 R–OH
R–NH2
5.0
1.0
7.7
4.5
3.1 2.5 R–C≡C–H
5.7 5.2
5.0 4.6
2.6 2.1
Si(CH3)4
0.0
2.5 2.2
13 10
4.0 3.3 R–CH2OH
3.9 3.3 R–CH2OR 1.9 1.6
9.6 9.5
3.8 3.6 R–CH2–Cl 1.7 1.4 R3C–H
9.5 6.0
3.6 3.4 R–CH2–Br 1.4 1.2 R–CH2–R
3.3 3.1 R–CH2–I 1.0 0.8 –CH3
11.0 10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0 –1.0
Chemical shift, δ (ppm)