

AMERICAN UNIVERSITY OF THE MIDDLE EAST, KUWAIT

ORGANIC CHEMISTRY LAB 1 (CHM263)

ASSIGNMENT 2

SPECTROSCOPY: NMR

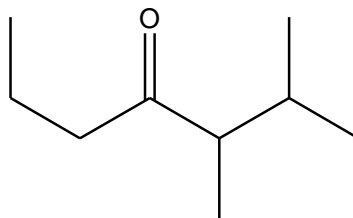
<i>Student Name</i>	<i>Student ID</i>	<i>Student Grade</i>

**Regulations:**

1. You may print this assignment as a hard copy.
2. Write your name and your ID# in the space above
3. Write your detailed answers on the **hard copy** in the designated space for each question
4. Use blue pen for handwriting your answers.
5. If you cannot print a hard copy of the assignment, then you may write your answers on white paper. However, you need to make sure that your answers are very clear and organized. You need to redraw required tables and graphs whenever applies. If your answers are related to a figure then you must mention it clearly
6. Scan the assignment (hard copy) with your detailed answers and save it as **one pdf file**
7. Submit the **pdf (only one file)** through the assignment link on your Moodle section page before the announced deadline below
8. You can submit your assignment no more *than twice*. So make it count
9. Students are fully responsible for the correctness of the submitted file. Students are fully responsible to make sure that their file is not corrupted and it is readable and clear. Any unclear answer wouldn't be graded.
10. Unreadable corrupted files would result in a zero grade if not resubmitted correctly before the deadlines specified below.
11. **Deadline:** **Wednesday (March 31, 2021) midnight**. Late submission will be allowed with penalty (check the table below)
  - Delay by 1 calendar Day – 40% Deduction (grade is multiplied by 0.6)
  - Delay by 2 calendar Days – 60% Deduction (grade is multiplied by 0.4)

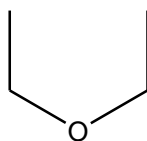
1. Predict **the chemical shifts** and **multiplicity** of each kind of hydrogen in the following compounds. (It is recommended to assign a letter for each kind of hydrogen to answer this question properly)  
**(36 points)**

a) 27 points (1.5 pts each box)



Letter	No. of Hydrogen	Chemical Shift (ppm)	Multiplicity
a			
b			
c			
d			
e			
f			

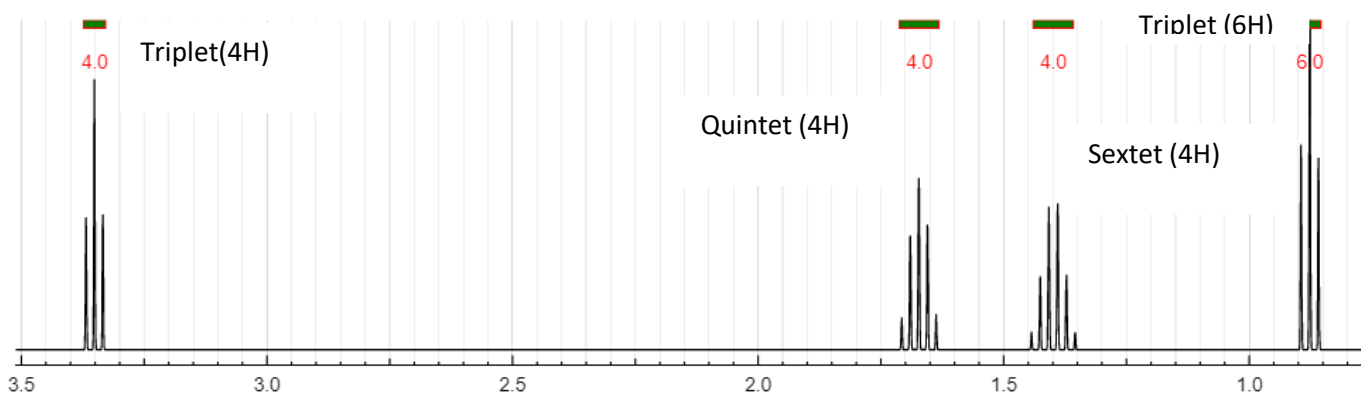
b) 9 points (1.5 pts each box)



Letter	No. of Hydrogen	Chemical Shift (ppm)	Multiplicity
a			
b			

2. Provide the structure of a compound having a molecular formula of  $C_8H_{18}O$  that is consistent with the following spectrum. **Show your work by assigning the peaks! (24 points)**

Grade Distribution	
Assign the peaks NMR spectra, approximate $\delta$ and type of proton as given in scheme 13.3	10 points
Provide the correct structure.	10 points
Explain why the provided structure is the correct one.	4 points



3. Provide a structure of a compound having a molecular formula of  $C_5H_{10}O_2$  that is consistent with the following spectra (IR and  $^1H$  NMR). Note that there is an overtone in the IR spectrum at  $3400\text{ cm}^{-1}$ . Show your work by assigning the peaks in both IR and NMR charts. (40 points)

Grade Distribution	
Assign the peaks IR spectra, provide the functional groups and wavelength.	10 points
Assign the peaks NMR spectra, approximate $\delta$ and type of proton as given in scheme 13.3	15 points
Provide the correct structure and explain why the provided structure is the correct one.	15 points

