RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
Second Year – Semester II Examination – April / May 2015

CHE 2106 SPECTROSCOPIC METHODS IN ORGANIC CHEMISTRY

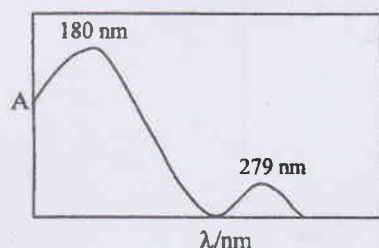**Answer ALL Questions**   **Time: One (01) hour.**

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1. (a). Describe the structural features of molecules that can be determined by spectroscopy.

(05 marks)

   (b). The UV spectrum of Acetone is given below. Discuss the electronic transitions of Acetone
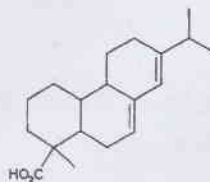
(10 marks)

   (c). Calculate the UV λ_{max} of the following structures using Woodward-Fischer rule. (Basic value for acyclic conjugated system: 217 nm, conjugated enone : 215, heteroannular conjugated system: 214 nm, homoannular conjugated system 253 nm, Alkyl substitution : 5 nm, Exocyclic double bond : 5 nm)   (20 marks)
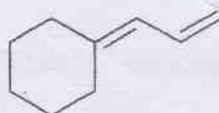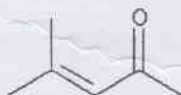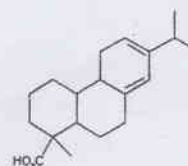

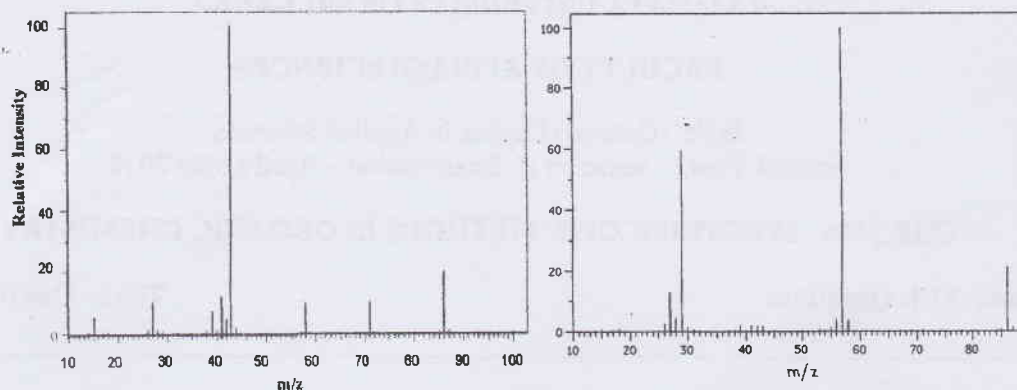(i)   (ii)   (iii)   (iv)
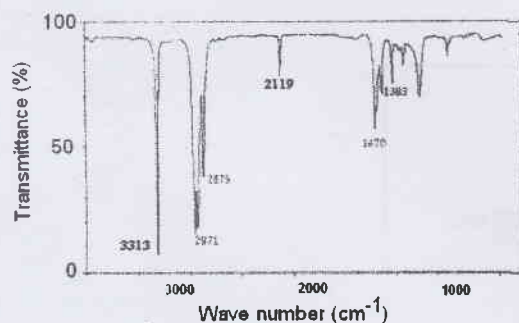
2. (a). Write a briefly note about the fragmentation process of the Mass spectrometry. (10 marks)
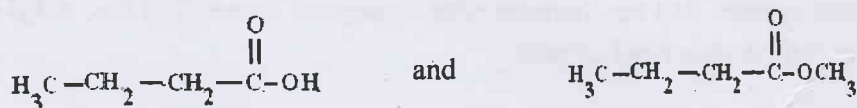
(b). Mass spectrums of 2-Pentanone and 3-Pentanone are given below. Identify the relevant spectra and discuss the fragmentation. (20 marks)

3. (a). In the IR spectrum, 1-Hexyne shows two sharp peaks at 2119 nm and 3313 nm, while 3-Hexyne not showing any of those peaks. Explain. (10 marks)

(b). How would you distinguish between the two compounds in each of the following pair by Infrared spectra. (10 marks)

$$H_3C-CH_2-CH_2-\overset{\displaystyle O}{\overset{\displaystyle \|}{C}}-OH \quad \text{and} \quad H_3C-CH_2-CH_2-\overset{\displaystyle O}{\overset{\displaystyle \|}{C}}-OCH_3$$

(c). Write down the number of signals, their relative positions and sketch the ^{13}C NMR of following compounds. (15 marks)

CH_3-O-CH_3
dimethyl ether

$$\underset{\text{methyl acetate}}{CH_3-\overset{\displaystyle O}{\overset{\displaystyle \|}{C}}-OCH_3}$$

$CH_3-CH_2-CH_2-OH$
1- propanol

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