RAJARATA UNIVERSITY OF SRI LANKA

FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences
Second Year – Semester II Examination – April / May 2016

CHE 2106 SPECTROSCOPIC METHODS IN ORGANIC CHEMISTRY

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

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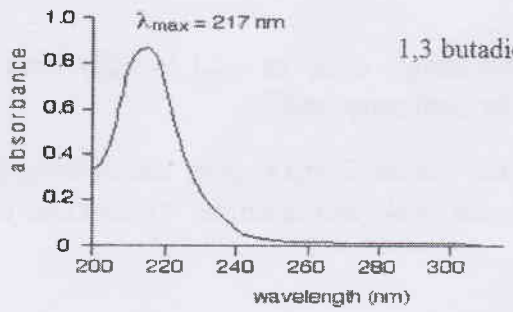
1. (a). List out four spectroscopic techniques that can be used to study the structural features of molecules, and briefly describe them. (10 marks)

(b). State Beer Lambert law and describe each parameter / constant (s). (06 marks)

(c). The UV spectrum of butadiene is given below. Discuss the electronic transitions of the molecule. (08 marks)



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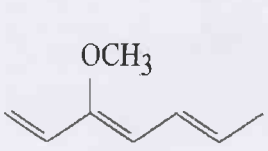
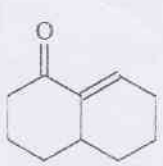
(d). Calculate the UV λ_{max} of the following structures using Woodward-Fischer rule. (Basic value for acyclic conjugated system= 217 nm, conjugated enone= 215 nm, heteroannular conjugated system = 214 nm, homoannular conjugated system= 253 nm, -OR group = 6 nm, Alkyl substitution = 5 nm, Exocyclic double bond = 5 nm, α- substituent = 10 nm, β-substituent = 12 nm, extended conjugation = 30 nm)

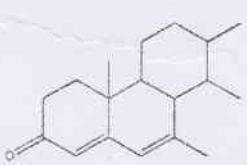
(16 marks)



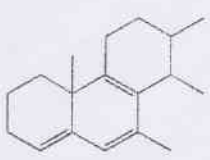
(i)



(ii)



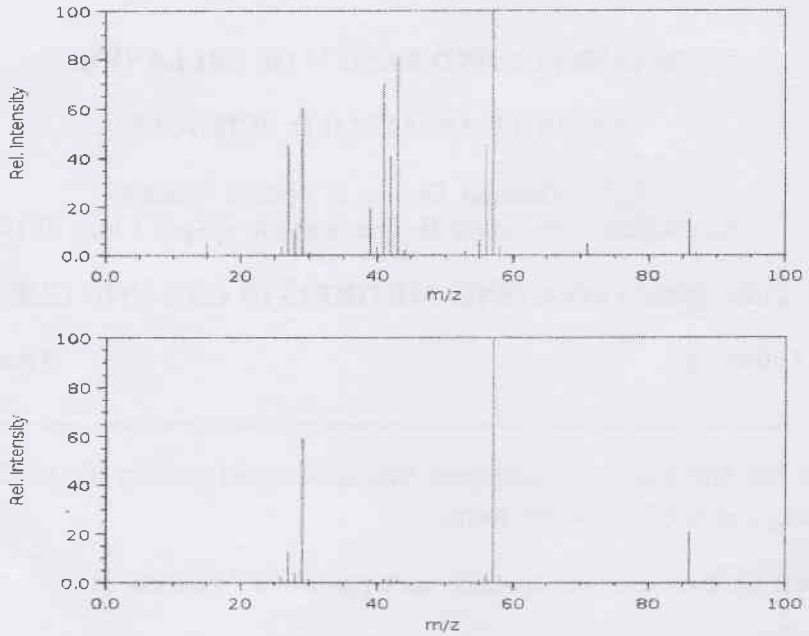
(iii)



(iv)

2. (a). Write a brief account on detection of ions in Mass spectrometry. (15 marks)

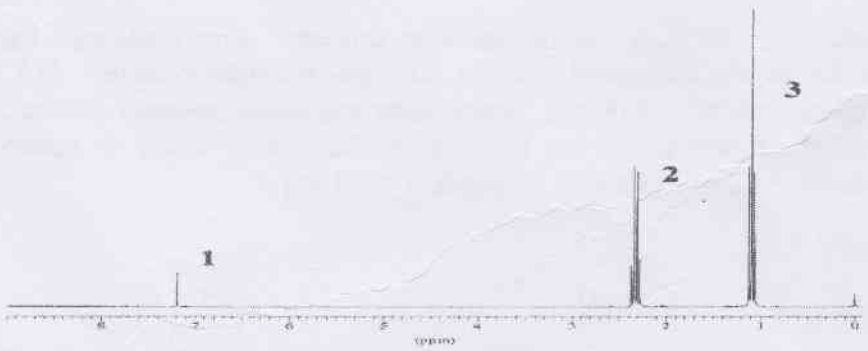
(b). Mass spectrums of 3-Pentanone and n-Hexane are given below. Identify the relevant spectra and discuss the fragmentation. (20 marks)



3. (a). Suggest how infra-red spectroscopy could be used to differentiate Butanal from 1-Butanol. Draw possible IR spectra for both compounds. (15 marks)

(b). A compound with molecular formula $C_3H_6O_2$ gives the following peaks in its proton NMR spectrum. Identify the relevant peaks and determine the structure of the compound.

(10 marks)



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