



EASTERN UNIVERSITY, SRI LANKA
SECOND EXAMINATION IN SCIENCE (2003/2004)
EXTERNAL DEGREE
SECOND SEMESTER (OCT./NOV. 2007)
EXTCH 203 SPECTROSCOPIC METHODS

Time allowed: ONE Hour

Answer all questions

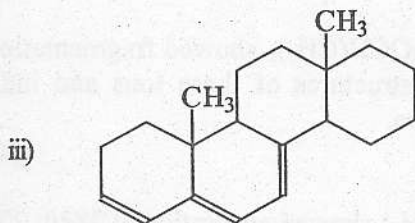
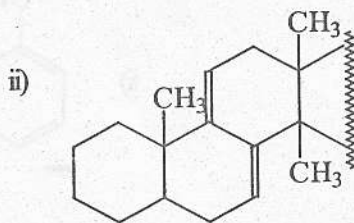
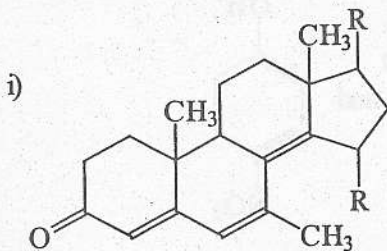
The use of a non-programmable calculator is permitted

- 1) a) What would happen to λ_{\max} value of a benzene in UV spectrum when,
- Another benzene ring is fused
 - Electronically complementary groups are situated para to each other.

Give reason for your answer.

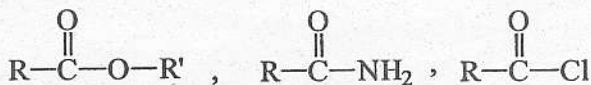
(16 marks)

- b) Calculate the λ_{\max} value for the following compounds



(24 marks)

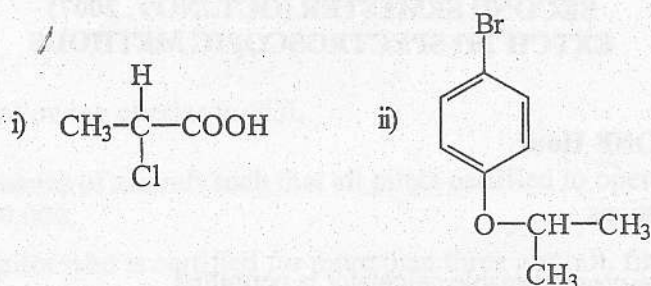
- c) Give the increasing order of C=O stretching frequencies of the following compounds. Give reason(s) for your answer.



(30 marks)

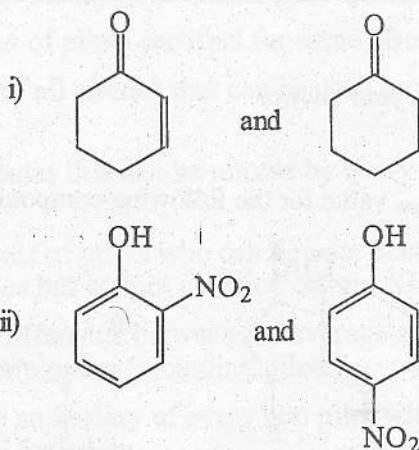
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d) Sketch the $^1\text{H-NMR}$ spectrum including the splitting pattern expected for each of the following compounds with TMS as a standard. Predict the approximate chemical shift in each of the spectra.



(30 marks)

2) a) How would IR spectroscopy be useful in distinguishing between the following pairs of compounds?



(20 marks)

b) The mass spectrum of $\text{CH}(\text{CH}_3)_2\text{OCH}(\text{CH}_3)_2$ showed fragmentation at 102, 87, 59, 45, 43 and 27. Give the structures of these ions and indicate the possible pathways for their formation.

(30 marks)

c) An organic compound A ($\text{C}_5\text{H}_{10}\text{N}_2$) showed absorption at 2820, 2250, 1075 and 1450 cm^{-1} in its IR spectrum. The $^1\text{H-NMR}$ spectrum of A had signals at δ 2.8(t, 2H), 2.4(s, 6H), 1.97(t, 2H). Interpret the spectral data and deduce the structure of the compound A.

(50 marks)