EASTERN UNIVERSITY, SRILANKA
SECOND EXAMINATION IN SCIENCE (FIRST SEMESTER)-2002/2003
CH 203 SPECTROSCOPIC METHODS

me: 01 Hour

nswer all questions

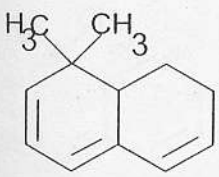
(a) From the spectral data given below deduce the structure of the compound P of molecular formula $C_{11}H_{14}O_2$.

UV λ_{max} = 220 nm ε = 1800 ($CHCl_3$)

IR ; ν_{max} (cm^{-1}) ; 3077 (weak),
2976 (weak),
1745 (strong),
1608 (medium),
1497 (medium) and
1250 (medium)

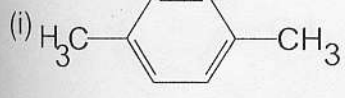
NMR ; τ value ; 2.71 (singlet , 5H)
5.70 (triplet, J = 7.3 Hz, 2H)
7.07 (triplet, J= 7.3 Hz, 2H)
7.57 (quartet, J = 7.5 Hz, 2H) and
8.85 (triplet, J= 7.5Hz, 3H)

(a) Using the Woodward –Fieser-Scott rules, calculate the wavelength of maximum absorption (λ_{max}) in the UV of the following compound.



(b) The mass spectrum of phenyl acetone $C_6H_5CH_2\overset{\overset{O}{\|}}{C}CH_3$ showed fragment ions at m/z 134, 91,77,65 and 43. Give the structure of these ions and indicate the possible pathways for their formation.

(c) Sketch the proton NMR spectrum, including the multiplet pattern, expected for each of the following compounds with TMS as the standard. Predict the approximate chemical shift in your spectrum.

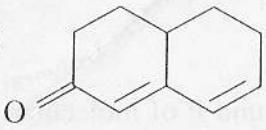
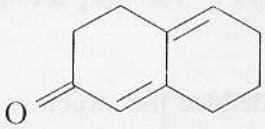
(i) 

(ii) $CH_3CD_2CH_3$

contd....

(d) Briefly explain how you would distinguish between members of each of the following compounds using the method indicated

i) Ortho-hydroxybenzaldehyde and parahydroxybenzaldehyde (IR)

ii)  and  (UV)

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