Eastern University, Sri Lanka

Second Year Second Semester Examination in Science-2010/2011

(April/ May 2012)

CH 203 Spectroscopic Methods

(Proper and Repeat)

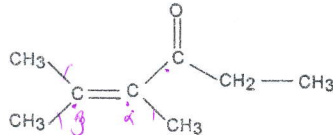**Answer all questions**   **Time: 01 hour**

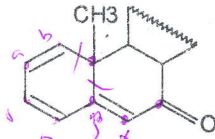01. (a) Discuss the effects of conjugation on the λ max values of alkenes.

(30 Marks)

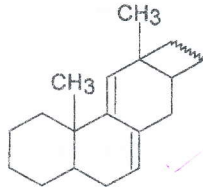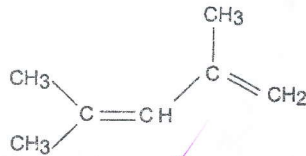(b) Calculate the λ max values of the following compounds?

(i)

(ii)

(iii)

(iv)

(40 Marks)

(c) (i) How can extract information from off resonance decoupled ^{13}C spectrum and DEPT experiments?

(20 Marks)

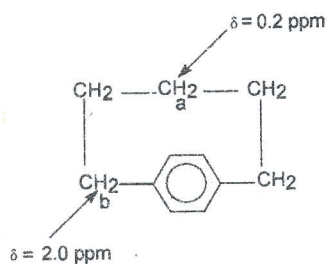(ii) How can be used IR spectroscopy to distinguish between ethanol and dimethyl ether?

(10 Marks)

Contd…

02. (a) (i) What are the factors which affecting the chemical shift values?

(10 Mar

(ii) Explain the following observation.

$\delta = 0.2$ ppm

$$CH_2 \text{---} CH_2 \text{---} CH_2$$
$$a$$

$$CH_2 \text{---} \bigcirc \text{---} CH_2$$
$$b$$

$\delta = 2.0$ ppm

(25 Marks)

(25 Mar

(b) An alcohol with the molecular ion peak at m/z 88 gave fragments m/z at 59 and 41. Propose a structure of the alcohol by using the mass spectral data. Give structures of the fragments at 59 and 41?

(20 Ma

(c) A compound with the molecular formula $C_{10}H_9NO_2$ has the following IR, ^{1}H-NMR and

^{13}C- NMR spectral data. Interpret the spectral data and suggest a possible structure for compound.

IR (cm^{-1}): 820 (m-s), 1200 (s), 1450 and 1375 (m), 1600 and 1475 (m-w), 1700 (s), 2250 3100 (s) and 3200 (m).

^{1}H NMR δ (ppm): 1.4 (3H, d), 4.2 (1H, q), 7.8 (2H, d), 8.1 (2H, d) and 10.0 (1H, s).

(45 Ma

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