The Open University of Sri Lanka
B.Sc Degree / Stand Alone Programme 2010/2011
Organic Chemistry – CMU2221
Level 4 – Assignment I – (NBT)
25-11-2010



# Answer Guide

**(01) a.**

| IR Absorption | Assignment |
|---|---|
| 2125 $cm^{-1}$ | C≡C |
| 3324 $cm^{-1}$ | ≡C–H |
| 1600 $cm^{-1}$ | aromatic / C=C |
| 3200 $cm^{-1}$ | —OH |
| 1730 $cm^{-1}$ |  |

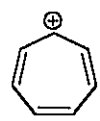
b. $\bar{\upsilon} \propto \sqrt{\frac{f\,(m_1+m_2)}{m_1 m_2}}$ f- force constant

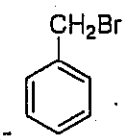
Both are single bonds. Hence force constant / bond strength are roughly the same.

$\therefore$ Increase in $\left(\frac{m_1+m_2}{m_1 m_2}\right)$ will increase the $\bar{\upsilon}$

$\left(\frac{m_1+m_2}{m_1 m_2}\right)$ is higher in O-H than C-O. Therefore OH frequency $\bar{\upsilon}$ is higher.

(Refer page no 21, Unit no. 02)

**(02)** a. Br b.Structure responsible for Base peak 

A- 


**(03)** Base value for homoannular or cis-oid diene = 253 nm
Double bond extending conjugation = 30 nm
Exocyclic double bonds = 10 nm
Alkyl substituents or ring residues = 25 nm
Observed UV $\lambda_{max}$ value of compound B = 318 nm

**(04) a.**

| Wave number ($cm^{-1}$) | Bond / Group |
|---|---|
| 3200-3600 $cm^{-1}$ | OH |
| 1600 $cm^{-1}$ | aromatic / C=C |

**b.**

| Chemical Shift (δ) | 7.33 | 7.25 | 3.83 | 2.87 | 2.35 |
|---|---|---|---|---|---|
| No. of protons | 2H | 3H | 2H | 2H | 1H |

c. δ 3.83 triplet; δ 2.87 triplet. Hence $CH_2CH_2$ group is present
Peak at δ 2.35 is broad due to OH group (compound contains IR absorption for OH)
δ 7.33 & 7.25 multiplet for 5H. Hence monosubstituted aromatic ring is present.
The possible structure is