

Seat No. : _____

NF-130
December-2015
M.Sc., Sem.-III
303 : Chemistry
(Organic)

Time : 3 Hours]

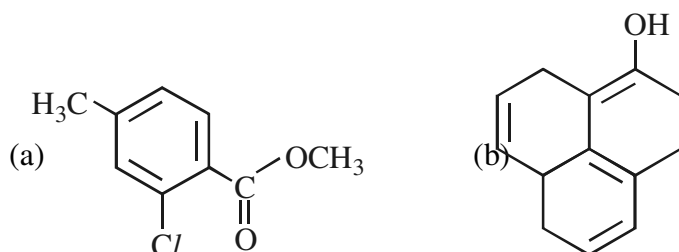
[Max. Marks : 70

- Instructions :** (1) All the questions are compulsory.
(2) Figure to right indicates full marks.

1. (A) (1) Write a short note on UV Spectra and polynuclear aromatic hydrocarbons. **4**
(2) Explain relation between UV Spectra and Geometric isomers. **3**

OR

- (1) Explain auxochromes and chromophores. **3**
(2) Calculate the λ_{\max} values for the following compounds : **4**



- (B) (1) Explain bending vibrations of non-linear AX_2 type molecule in IR Spectra. **4**
(2) Discuss Pallet method to prepare solid samples in IR spectra. **3**

OR

- (1) Discuss factors affecting to frequency in IR spectra. **4**
(2) How can you distinguish styrene and ethyl benzene by IR spectra ? **3**

2. (A) What is chemical shift ? Explain shielded and deshielded protons. 7
- OR**
- (1) Write a note on COSY2D NMR spectroscopy. 4
- (2) Explain TMS. 3
- (B) (1) Write a note on shift reagents in NMR spectra. 4
- (2) Write a note on nuclear overhauser effect. 3
- OR**
- (1) Role of fluorine in ^1H -NMR spectra. 4
- (2) How can you distinguish 1-butyne and 2-butyne by ^1H NMR spectra ? 3
3. (A) (1) Explain Mchafferty rearrangement. 4
- (2) Give names of various hyphenated techniques of mass spectroscopy. 3
- OR**
- (1) Give fragmentation of acetophenone. 3
- (2) Write a note on any two ionization techniques in mass spectroscopy. 4
- (B) (1) What is off-resonance decoupling in ^{13}C -NMR ? 4
- (2) Explain how factor like electro-negativity affects the ^{13}C chemical shift by taking suitable example. 3
- OR**
- (1) Explain DEPT spectrum in ^{13}C -NMR. 4
- (2) Write a short note on ^{13}C -NMR applications. 3

4. (A) An organic compound with MF $C_7H_{14}O$ exhibits the following spectral data : 7

IR : $2990, 1690\text{ cm}^{-1}$.

$^1\text{H NMR}$: $\delta 0.9$ (6 H, triplet), 1.6 (4H, sextet), 2.4 (4H, triplet)

$^{13}\text{C NMR}$: $\delta 13.6, 16.9, 44.8, 210.8$ ppm

HRMS : 114.1855

Deduce the structure of the compound with suitable explanation.

OR

An organic compound with MF $C_{10}H_{12}O_2$ exhibits the following spectral data : 7

UV : $\lambda_{\text{max}} 263\text{ nm}$ 410E

IR : $2832, 1712, 1632, 1598, 1550, 1355, 1328, 1237, 1105, 732, 694\text{ cm}^{-1}$.

$^1\text{H NMR}$: $\delta 1.12$ (6H, doublet), 3.46 (1H, multiplet) 7.21 (5H, singlet)

$^{13}\text{C NMR}$: $\delta 15.1, 27.2, 124.9, 128.2, 135.6, 149.3, 173$ ppm

Deduce the structure of the compound with suitable explanation.

(B) An organic compound with a MF $C_5H_8O_2$ exhibits the following spectral data : 7

IR : $1724, 1150\text{ cm}^{-1}$.

$^1\text{H NMR}$: $\delta 2.7$ (4H,t), 4.1 (4H,t)

$^{13}\text{C NMR}$: $\delta 42.9, 68.8, 208.6$ ppm

HRMS : 100.1156

Deduce the structure of the compound with suitable explanation.

OR

An organic compound with MF $C_9H_{16}O_4$ exhibits the following spectra data : 7

UV : No strong band

IR (KBr) : $2900, 2865, 1735, 1240\text{ cm}^{-1}$.

$^1\text{H NMR}$: $\delta 1.47$ (6H,S), 1.29 (6H,t), 4.14 (4H,q)

$^{13}\text{C NMR}$: $\delta 14.2, 22.8, 50.5, 61.6, 171.4$

HRMS : 188.1049 .

Deduce the structure of the compound with suitable explanation.

5. Answer the following questions in brief :

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- (1) Give examples of two solvents used in UV spectra.
 - (2) The rules to calculate λ_{max} of diene and enone compounds are called ?
 - (3) What is blue shift in UV spectra ?
 - (4) Why IR spectra called band spectra ?
 - (5) Give examples of two compounds which are IR transparent.
 - (6) What is the use of IR spectra ?
 - (7) Name any three types of NMR spectra.
 - (8) How many signals can Anthracene gives in ^1H NMR ?
 - (9) What is the relation between δ (delta) and τ (Tau) ?
 - (10) What is the natural abundance of ^{13}C ?
 - (11) How many peaks 3-pentanone give in ^{13}C NMR ?
 - (12) What is CSCM ?
 - (13) What is INADEQUATE ?
 - (14) Give symbol of radical cation.
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