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1905E713

Candidate's Seat No :

M.Sc. (Sem.-III) Examination

503 Chemistry (Org.)

Time : 3 Hours] **May-2017** **[Max. Marks : 70**

1. Answer the following questions.

(a) Write a note on IR and H----bonds. (7)

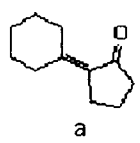
OR

(a) Write a note on sampling techniques used in preparation for solid and gaseous sample for IR studies.

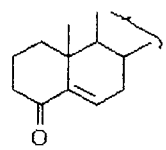
(b) Discuss the application of UV spectra to differentiate geometrical isomers of Cinnamic acid. (7)

OR

(b) The following α,β-unsaturated ketone have λ_{max} at 241mμ, 254mμ and 259mμ in ethanol solvent. Assign given values for each.



a



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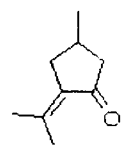

c

2. Answer the following questions.

(a) Discuss the importance of chemical shift and coupling constant in PMR spectroscopy. (7)

OR

(a) Explain the terms long range coupling and spin decoupling with suitable example.

(b) Why TMS is used as reference standards for NMR spectroscopy. (7)

OR

(b) Write a note on HETCOR NMR spectroscopy.

3. Answer the following questions.

(a) Discuss chemical shift and its prediction in ^{13}C NMR of saturated aliphatic hydrocarbons. (7)

OR

(a) Discuss the basic principle of ^{13}C NMR spectroscopy. What information we get from CMR spectrum.

(b) Write a note on Mc-Lafferty rearrangement . (7)

OR

(b) Discuss different Ionization techniques in Mass Spectrometry.

(P.T.O)

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4. Answer the following questions.

(a) An organic compound with MW 174 exhibits the following spectral data: (7)

UV: λ_{max} 213mμ

IR: 2941-2857(m), 1745(s) and 1458(m) cm^{-1}

^{1}H NMR: 5.86 τ (quartet, *J*= 7.2cps, 10.4squares)
7.40 τ (singlet, 10.8squares) and
8.73 τ (triplet, *J*= 7.2cps, 16.0squares)

Deduce the structure of the compound with suitable explanation.

OR

(a) An organic compound with MW 135 exhibits the following spectral data:

UV: λ_{max} 273nm

IR: 3410, 2829, 1698, 1642, 1578, 1237, 737, 698 cm^{-1}

^{1}H NMR: δ1.6(s, 1H), 2.26(s, 3H), 6.98(s, 5H)

^{13}C NMR: δ 28.0, 126.0, 128.1, 130.2, 130.5, 207.5

Deduce the structure of the compound with suitable explanation.

(b) Deduce the structure of the compound with suitable explanation from given spectral data.
Molecular weight: 153 (7)

UV: λ_{max} 223mμ

IR: 3125-2899(m), 2688(w), 2604(w), 1715(s) and 1436(m) cm^{-1}

^{1}H NMR: -1.93 τ (singlet, 7.8 squares)
5.48 τ (quartet, *J*= 7.2cps, 7.4squares) and
8.17 τ (doublet, *J*= 7.2cps, 22.4squares)

OR

(b) An organic compound having boiling point 124^0C.Deduce the structure of the compound from given data.
Elemental Analysis: C-73.63; H-12.36; O-14.01.
Molecular ion peak: 114m/e

IR: 2950, 1390, 1365, 1710cm^{-1}

^{1}HNMR: δ 1.1(doublet, 6H), 2.8(septet, 1H)

^{13}C NMR: 17.3(singlet), 40.2(doublet) and 214.4(quartet) ppm.

5. Answer the following questions in short. **(14)**

1) Interpret the two bands of C-H stretching in aldehyde group.
2) Why the detectors used in UV and Visible spectrophotometer are not used in IR spectrophotometer?
3) What is Globar?
4) Why ^{13}C NMR spectra are more difficult to record compared to ^{1}H NMR Spectra?
5) Why the stretching frequency of carbonyl group is lower in cyclohexanone than cyclopropanone.
6) Why Anilium cation exhibits UV spectrum almost similar to benzene.
7) Give full name of DSS.
8) Calculate the fundamental modes of vibrations for CO_2 molecule?
9) What is the fundamental requirement for organic compounds to be NMR active?
10) Enlist the name of different chemical ionization techniques used in mass spectrometry.
11) Mention the name of any two mass analysers.
12) How will you differentiate the isomers of tribromobenzene on the basis of CMR spectra?
13) Write nitrogen rule?
14) Convert the chemical shift value of 5.6 Tau in to HZ (100MHZ NMR spectrophotometer is used).

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SELECTED SPECTRAL DATA

Characteristic Infrared Absorption Frequencies

Bond Type	Stretching, cm^{-1}	Bending, cm^{-1}
C-H alkanes	2960-2850 (s)	1470-1350 (s)
C-H alkenes	3080-3020 (m)	1000-675 (s)
C-H aromatic	3100-3000 (v)	870-675 (v)
C-H aldehyde	2900, 2700 (m, 2 bands)	
C-H alkyne	3300(s)	
C≡C alkyne	2260-2100 (v)	
C≡N nitrite	2260-2220 (v)	
C=C alkene	1680-1620 (v)	
C=C aromatic	1600-1450 (v)	
C=O ketone	1725-1705 (s)	
C=O aldehyde	1740-1720 (s)	
C=O α,β-unsaturated ketone	1685-1665 (s)	
C=O aryl ketone	1700-1680 (s)	
C=O ester	1750-1735 (s)	
C=O acid	1725-1700 (s)	
C=O amide	1690-1650 (s)	
O-H alcohols (not hydrogen bonded)	3650-3590 (v)	
O-H alcohols (hydrogen bonded)	3600-3200 (s, broad)	1620-1590 (v)
O-H acids	3000-2500 (s, broad)	1655-1510 (s)
N-H amines	3500-3300 (m)	
N-H amides	3500-3350 (m)	
C-O alcohols, ethers, esters	1300-1000 (s)	
C-N amines, alkyl	1220-1020 (w)	
C-N amines, aromatic	1360-1250 (s)	
NO_2 nitro	1560-1515 (s)	
	1385-1345 (s)	

s = strong absorption
m = medium absorption
w = weak absorption
v = variable absorption

Typical chemical shifts for Types of Hydrogen Atoms, Seen in Proton Magnetic Resonance Spectra

Type of Hydrogen Atom	δ*	Type of Hydrogen Atom	δ*
RCH_3	0.9	$R_2C{=}CH_2$	5.0
RCH_2R acyclic	1.3	$RCH{=}CR_2$	5.3
acyclic	1.5	ArH	7.3
R_3CH	1.5–2.0	$\begin{matrix}O\\\|\\RCH\end{matrix}$	9.7
$R_2C{=}C\begin{matrix}CH_3\\\|\\R'\end{matrix}$	1.8	RNH_2	1–3
$\begin{matrix}O\\\|\\RCCH_3\end{matrix}$	2.0–2.3	$ArNH_2$	3–5
$ArCH_3$	2.3	$\begin{matrix}O\\\|\\RCNHR\end{matrix}$	5–9
$RC{\equiv}CH$	2.5	ROH	1–5
$RNHCH_3$	2–3	ArOH	4–7
RCH_2X(X = Cl, Br, I)	3.5	$\begin{matrix}O\\\|\\RCOH\end{matrix}$	10-13
$ROCH_3$, $\begin{matrix}O\\\|\\RCOCH_3\end{matrix}$	3.8		

(P.T.O)

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C_4H_4, C_2N_2

C_4H_5

$CH_2 = CH - CH = CH_2$

$CH_2 = CHCHCH_3$

$CH_2 = CHCH_2CH_3$, $CH_3CH = CHCH_3$, 2CO

C_4H_9 (butyl ketones), C_2H_5CO (ethyl ketones, EtC=OG, G = various structural units)

NCS, (NO + CO), CH_3COCH_3, C_4H_{10}

Chemical Shifts for Carbon Atoms in Carbon - 13 Nuclear Magnetic Resonance Spectra

Type of Carbon Atom	δ*	Type of Carbon Atom	δ*
RCH_2CH_3	13–16	$RCH = CH_2$	115–120
RCH_2CH_3	16–25	$RCH = CH_2$	125–140
R_3CH	25–38	$RC \equiv N$	117–125
$CH_3\overset{O}{\overset{\|}{C}}R$	~30	ArH	125–150
$CH_2\overset{O}{\overset{\|}{C}}OR$	~20	$R\overset{O}{\overset{\|}{C}}OR'$	170–175
RCH_2Cl	40–45	$R\overset{O}{\overset{\|}{C}}OH$	177–185
RCH_2Br	28–35	$R\overset{O}{\overset{\|}{C}}H$	190–200
RCH_2NH_2	37–45	$R\overset{O}{\overset{\|}{C}}R'$	205–220
RCH_2OH	50–64		
$RC \equiv CH$	67–70		
$RC \equiv CH$	74–85		

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1805E672

Candidate's Seat No : _____

M.Sc. (Sem.-III) Examination
502 Chemistry (Org.)
May-2017

Time : 3 Hours] **[Max. Marks : 70**

Instructions: All questions carry equal mark..

Figure to the ritght indicates full marks of question.

Q.1(a) (1) What are non classifiable antibiotics ? 7

(2) Give synthesis and uses of ampicillin. **OR**

(1) Discuss third generation cephalosporines.

(2) Discuss structure activity relation of tetracyclins.

(b)(1) Discuss the mode of action of B- lactum antibiotics. 7

(2) Give synthesis and uses of : penicillin **OR**

(1) Discuss structure variation in penicillin.

(2) Give synthesis and uses of : Chloromphenicol.

Q.2(a) (1) Discuss intravenous general anaesthetics and Give synthesis of glutethamide. 7

(2) Discuss cardinal points relating SAR amongst barbiturates. **OR**

(1) Discuss the mode of action and SAR of Novalgin

(2) Give synthesis and uses of : Amyl nitrate and Pethidine.

(b) (1) What are neuroleptics ? Classify them giving one example each. **OR** 7

(1) What are antipsychotic drugs ? Give their structure activity relationship.

(2) Give synthesis and uses of : Thiopental, Lidocain and alprezolam.

Q.3 (a) (1) Discuss modern chemotherapy of malaria and Give synthesis of daraprim. 7

(2) Give synthesis and uses of chloroquine phosphate. **OR**

(1) Discuss the mode of action and SAR of antimalarials.

(2) Give brief account for structure variation in 4- amino quinolines as an antimalarials.

(b) (1) Why combination theory is used in treatment of tuberculosis. 7

(P.T.O)

(2) Give synthesis and uses of DDS ,ethambutol and isoniazide. **OR**

(1) Give brief account of antimycobectrial agents and synthesis of Ethanamide

(2) Give synthesis and uses of mepacrine and mefloquine.

Q.4 (a) (1) What are anti arrhythmic agents? Discuss mode of action of anti arrhythmic agents. 7

(2) Give synthesis and uses of Atenolol, Tolbutamide and chloropropamide. **OR**

(1) Define and classify cardiovascular drugs and give one example in each class.

(2) Give synthesis and use of propranolol.

(b) (1) Discuss the structural variation in sulphonyl ureas. 7

(2) What are diuretics ? Give synthesis and uses of chlorothiazide. **OR**

(1) What is hypoglycemia ? Discuss the importance of insulin.

(2) Give synthesis and uses of Ethacrynic acid .

Q.5 Answer in short. **14**

Define

(1) Hypnotic agents (2) Bacteriostatic and becteriocidal agents (3) Acid fast besilli.

What is

(4) Type II diabetes (5) SSRI agents (6) DOTS treatment.

Give structure of

(7) Methyl Dopa (8)Furasemic acid (9) Ibuprofen (10) Nikethamide

(11) Glibenclamide

(12) Differentiate Local and general anaesthetics.

(13) Which two diseases caused by mycobecteria.

(14) Name two parasite causing malaria.