647510 **BSCorgCC6020** **Seat No :_____**

B.Sc. Semester - 6 (*CBCS*) Examination
March/April -2019
ORGANIC CHEMISRTY AND SPECTROSCOPY(CORE)

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (A) Answer the following question. **[04]**

(1) Draw the full structure of two acidic and two basic amino acids.

Q. 1 (B) Answer any two questions out of three. **[10]**

(1) Prove the structure of Thyroxin.

(2) Give any two synthetic methods for poly peptide.

(3) (a) Explain Isoelectric point.

(b) Explain Gabrieal-phthalamide method.

Q. 2 (A) Answer the following question. **[04]**

(1) Give the synthesis and uses of PETN.

Q. 2 (B) Answer any two questions out of three. **[10]**

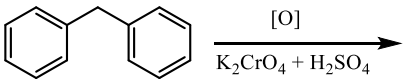
(1) Discuss constitution of Citral.

(2) Give the synthesis and use of musk xylene, RDX and parathion.

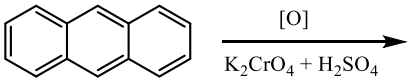
(3) Write any two synthesis of α – Terpineol

Q. 3 (A) Answer the following question. **[04]**

(1) Complete the following reactions:

(a)  $\xrightarrow[K_2CrO_4 + H_2SO_4]{[O]}$ Structure

Name

(b)  $\xrightarrow[K_2CrO_4 + H_2SO_4]{[O]}$ Structure

Name

Q. 3 (B) Answer any two questions out of three. **[10]**

(1) Explain Fischer Indole synthesis with full mechanism.

(2) Give any two syntheses for each of biphenyl and naphthalene.

(3) Explain Skraup synthesis with full mechanism.

Q. 4 (A) Answer the following question. **[04]**

(1) Calculate ^{1}H-NMR signals with notification for following molecules:

a) 1,2-dibromo propane
b) 1-propene
c) trans - 1,3-dimethyl cyclobutane
d) cis - 1,3-dimethyl cyclobutane

Q. 4 (B) Answer any two questions out of three. **[10]**

(1) Explain shielding and deshielding effect with example of ethyne and ethene.

(2) Determine the structure from following NMR data:

Molecular Weight = 264 gm/mole

C = 36.30%, H = 3.10%, Br = 60.60% *[atomic mass Br = 80 gm/mole]*

Types of proton	Multiplicity	τ_{ppm}	proton ratio
a	singlet	5.35	1:1
b	singlet	2.76	

(3) (a) Why TMS is used as reference compound in NMR spectroscopy?

(b) Determine the structure from following NMR data:

M. F. = $C_9H_{11}NO$

Types of proton	No. of proton	Multiplicity	δ_{ppm}
a	6H	singlet	2.89
b	2H	doublet	7.24
c	2H	doublet	7.66
d	1H	singlet	9.38

Q. 5 (A) Answer the following question. **[04]**

(1) Determine the structure from following spectral data:

M. F. = C_4H_5NO

IR: 2282, 1722 cm^{-1},

NMR:

Types of proton	No. of proton	Multiplicity	δ_{ppm}
a	3H	singlet	2.52
b	2H	singlet	3.82

Q. 5 (B) Answer any two questions out of three. **[10]**

(1) Determine the structure from following spectral data:

Molecular Weight = 222 gm/mole

C = 64.86%, H = 6.31%

U.V. = λ_{max} = 278 nm

IR: 3010, 2950, 1705, 1570, 1450, 1280, 1030, 830 cm^{-1}

NMR:

Types of proton	No. of proton	Multiplicity	δ_{ppm}
a	6H	triplet	1.30
b	4H	quartet	4.30
c	4H	singlet	7.50

(2) Write a note on "General Fragmentation Modes" in mass spectroscopy.

(3) Discuss conformational analysis of cyclohexane with potential energy diagram.

Spectroscopic data

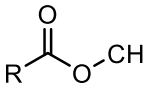
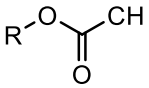
U. V.

Far U.V. Region	= 100 to 200 nm
Near U. V. Region	= 200 to 380 nm
Visible Region	= 380 to 780 nm

IR:

Aromatic C-H str	3100-3000 cm^{-1}
Alkane C-H str	3000-2900 cm^{-1}
Nitrile C-N str	2300-2200 cm^{-1}
Carbonyl C=O str	1800-1680 cm^{-1}
Alkane C-H bend	1470-1420 cm^{-1}
Ester C-O-C str	1300-1000 cm^{-1}

NMR:

Alkane C-H	0.9 – 2.5 δ_{ppm}
Alkyne C-H	2.5 – 3.9 δ_{ppm}
Alkene C-H	5.5 – 6.5 δ_{ppm}
Aromatic C-H	6.5 – 8.5 δ_{ppm}
Phenolic O-H	4.4 – 8.8 δ_{ppm}
Aldehydic C-H	8.0 – 10.0 δ_{ppm}
	2.1 – 2.9 δ_{ppm}
	4.0 – 4.5 δ_{ppm}