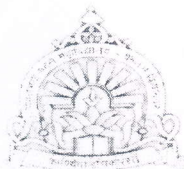


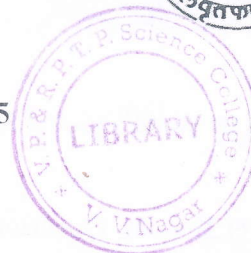
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BSC (Semester V) Internal Theory Examination - 2025

US05MACHE01 : ORGANIC CHEMISTRY - I

Date: 22/09/2025 Day: Monday

Time: 10:45 am to 12:15 pm

Total marks: 30

Q-1 Choose correct option for following questions

[06]

- (i) Using which kind of synthesis, Pyrrole can be prepared ?
(a) Skraup (b) Knorr (c) Bischler-Napieralski (d) all of these
- (ii) Which one has the properties of secondary aliphatic amine?
(a) Pyridine (b) Furan (c) Pyrrolidine (d) Thiophene
- (iii) Condensation of Benzaldehyde with acetic anhydride in the presence of sodium acetate produce ?
(a) Benzoic acid (b) Cinnamic acid (c) butyric acid (d) crotonic acid
- (iv) Which of the following represents 0 DBE?
(a) Ring (b) 1 DB (c) 2 DB (d) Saturated compound
- (v) How many NMR signals are possible for propene?
(a) 3 (b) 2 (c) 1 (d) 5
- (vi) Which of the following is used as reference in NMR?
(a) DDQ (b) CHCl_3 (c) TMS (d) None

Q.2: Long Question

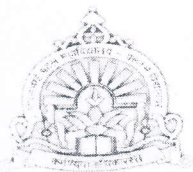
- (A) Explain : Nucleophilic substitution reaction in pyridine take place at 2 and 4 position and not 3rd position. [03]
- (B) Write Skraup synthesis for Quinoline. [03]

OR

- (A) Explain : Electrophilic substitution reaction in pyrrole takes place at 2nd position and not 3rd position. [03]

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(B) Write about chichibabin reaction.

[03]

Q.3: Long Question

(A) Write about Wittig reaction.

[03]

(B) Which one of the two aryl groups migrates in an unsymmetrical benzyls during Benzillic acid rearrangements?

[03]

OR

(A) Discuss Mannich reaction.

[03]

(B) Show that Favorski rearrangement involves symmetrical cyclopropanone intermediate.

[03]

Q.4: Long Question

(A) Discuss factors affecting IR spectra.

[06]

OR

(A) Deduce the structure:

[06]

(i) MF: C_2H_3N ; 3010-2950, 2255, 1370

(ii) MF: $C_4H_{10}O$; 2990-2875, 1140

Q.4: Long Question

(A) Give principle of IR spectroscopy and Discuss IR spectrometer.

[06]

OR

(A) Deduce the structure.

[06]

(i) MF: C_8H_8O ; 3070-3010, 2970-2860, 1685, 1605, 1582, 1450, 758, 688

(ii) MF: C_7H_8O ; 3065-3005, 2950-2850, 1604, 1498, 1350, 1040, 750, 688

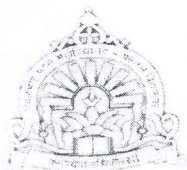
Q.5: Long Question

(A) Write a note on phenomenon of the splitting of NMR signals indicating clearly how the multiplicity of splitting reflects the number of protons adjacent to the absorbing protons. [06]

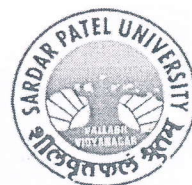
OR

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[06]

(A) Deduce the structure:

Molecular formula $C_3H_5ClF_2$

NMR (δ ppm): (a) 1.75, 3H, Triplet (b) 3.63, 2H, Triplet.

Molecular formula: $C_{10}H_{12}O$

NMR(δ ppm): (a) Doublet, 6H, 1.25 (b) Multiplet, 1H, 3.4 (c) Singlet, 5H, 7.67

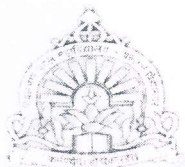


NMR Data

Type of H	δ ppm
Primary	0.9
Secondary	1.3
Tertiary	1.5
Aromatic	6-7
alcohol	3.5-4
Aldehyde	8-9
Acidic	10-11

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IR Group frequency : SELECTED SPECTRAL DATA

	Group	Compound	Frequencies (cm ⁻¹)
(a)	-C-H	Alkane, stretching	2850 - 2950
		Alkane, bending	1340 - 1480
		Alkene, stretching	3040 - 3100
	=C-H	Alkene, bending (cis)	700 - 780
		Alkene bending (trans)	900 - 980
		Alkyne, stretching	3200 - 3300
	-C-H	Aromatic, stretching	3000 - 3100
		Aromatic bending (monol)	690 - 710
		Aromatic bending (o, m, p)	730 - 770
	O=C-H	Aldehyde (two bands)	2700 - 2740
			2830 - 2900
(b)	-C-C	Alkyne	600 - 1500
	C=C	Alkene cis	1650 - 1660
		trans	1670 - 1680
	-C=C-	Alkyne	2100 - 2260
	C-C-	Aromatic	1500 - 1600
(c)	-C-O-	Alcohols, Phenols, Acids, ethers	1050 - 1200
	-C=O	Aldehyde, Ketone, Acid, Ester	1690 - 1760
	-C=O	Amide (-CONH ₂)	1650 - 1680
	C=O	Anhydride (two bands)	1740 - 1790
(d)	-O-H	Alcohols, Phenols, monomeric	3500 - 3600
	-O-H	Acids, monomeric	2500 - 3000
	-O-H	Hydrogen bonded	3200 - 3500
(e)	-C≡N	Nitrile	2240 - 2280
	-C-X	Halide	500 - 800
	C-N	Amide, Amine	1220 - 1340
	-N-H	Amide, Amine	3200 - 3500
	-NO ₂	Nitro (two bands)	1300 - 1370
			1500 - 1580

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BSC (Semester V) Quiz - 2025

US05MACHE01 : ORGANIC CHEMISTRY - I

Date: 22/09/2025 Day: Monday

Time: Maximum 20 minutes

Total marks: 15

Q-1 Fill in the blanks with appropriate answer given in the bracket.

[08]

- (i) Resonance energy of pyrrole is than benzene [less/more].
- (ii) Pyridine is basic than pyrrole [more/less].
- (iii) Carboxylic acid is converted in to during Curtius- Schmidt rearrangement. [primary amine / secondary amine]
- (iv) Conversion of ketoxime in to N-substituted amide in the presence of acid catalyst is known as [Beckmann rearrangement/Perkin reaction]
- (v) The unit for IR spectroscopy is [δ ppm/ cm^{-1}]
- (vi) is used as source in IR spectrometer. [Uv lamp/Nernst Glover]
- (vii) The scale of δ ppm in NMR is [0-10/0-100]
- (viii) radiation is used in NMR. [UVS ray/Radio wave]



Q. 2 Answer with either true or false.

[07]

- (i) Pyridine is more basic than ethyl amine [True/False].
- (ii) Pyridine-3-carboxylic acid is called Vitamin-B3 [True/False].
- (iii) Benzoin condensation reaction is used to produce Benzoin [True/False].
- (iv) Wittig reaction is used to prepare alkene [True/False].
- (v) The unit for IR spectroscopy is cm^{-1} [True/False].
- (vi) Methyl cyclohexane will give 2 signals in NMR. [True/False].
- (vii) The protons of acetylene are Deshielded. [True/False].