

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER : V
SESSION : MO/2024

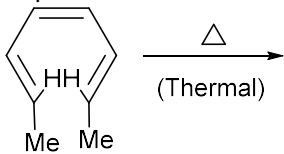
SUBJECT: CH327 ORGANIC CHEMISTRY-IV

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

		CO	BL
Q.1(a)	Discuss the fundamental equation of NMR and explain the term Chemical Shift. How is it measured relative to Tetramethyl Silane?	[5] 1	1
Q.1(b)	Explain with reason if you can differentiate ethane, ethylene and acetylene by NMR Spectroscopy.	[5] 1	2
Q.2(a)	Indicate what NMR spectra would you expect for the following compounds: i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ ii) $(\text{CH}_3)_4\text{C}$ iii) 1,2,2-Trichloropropane iv) Toluene	[5] 2	2
Q.2(b)	An organic compound with a molecular formula, $\text{C}_{10}\text{H}_{12}\text{O}_2$ gave an IR band ($\text{C}=\text{O}$ stretching) at 1740 cm^{-1} . The NMR shows a triplet at $\delta = 1.2$ (3H); singlet at $\delta=3.5$ (2H), quartet $\delta=4.1$ (2H) and a multiplet at $\delta=7.3$ (5H).	[5] 2	3
Q.3(a)	i) Convert D-Glucose Fisher Form to Pyranose Haworth Form. Draw and distinguish the α and β -form. ii) What is Mutarotation?	[5] 3	4
Q.3(b)	i) Draw the osazone formation mechanism for D-glucose? ii) Demonstrate the epimerization mechanism.	[5] 3	4
Q.4(a)	What is Pericyclic Reaction. Explain with example reaction with classification.	[5] 4	1
Q.4(b)	Draw the correlation diagram for the following thermal electrocyclic ring closure and explain the possible stereochemical product formation.	[5] 3	3
			
Q.5(a)	Draw a molecular orbital diagram and demonstrate the resonance structure of furan, pyrrole, and pyridine. Compare the reactivity.	[5] 1	2
Q.5(b)	Draw Hantzsch's synthesis of Pyrrole with the mechanism.	[5] 2	3

:::22/12/2024 M:::