

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

CLASS: IMSc.
BRANCH: Chemistry

SEMESTER : IX
SESSION : MO/2024

SUBJECT: CH507 SELECTED TOPICS IN ORGANIC SYNTHESIS

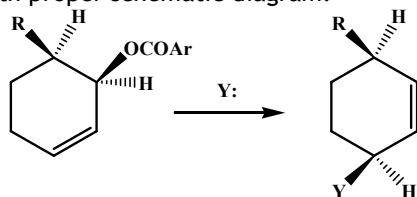
TIME: 3 Hours

FULL MARKS: 50

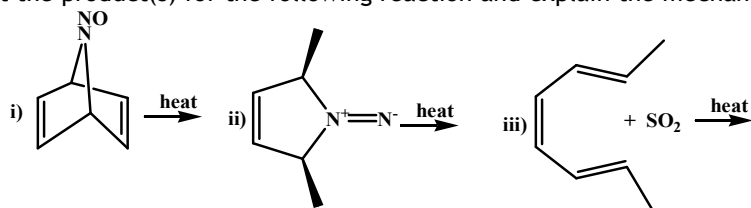
INSTRUCTIONS:

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. NO

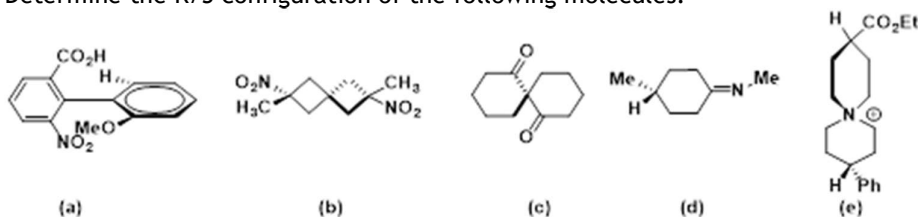
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|---|----|----|
| Q.1(a) Explain 2-Alkyl ketone effect with example. Describe the mechanism of pyramidal inversion for aziridine. Correlate the energy of pyramidal inversion for N-Me cyclic 3,4,5 and 6 membered compounds. [2+1+2] | 1 | I |
| Q.1(b) Write short note on conformation of cyclohexene. Elaborate the mechanism of the following reactions with proper schematic diagram. [5] | 2 | II |



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|---|---|-----|
| Q.2(a) What is group transfer reaction? Show the schematic of nonlinear and linear approach of carbene towards carbene in thermal process. Give the reason in favor of preferred pathway. [2+3] | 2 | II |
| Q.2(b) Predict the product(s) for the following reaction and explain the mechanism [1+2+2] | 2 | III |

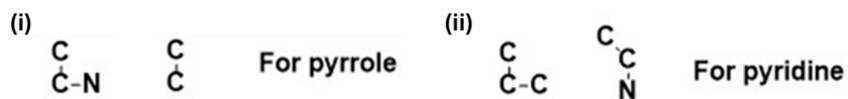


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|---|---|----|
| Q.3(a) (i) Give an example of a "pseudo asymmetric axis" containing molecule and identify the axial chirality of that molecule. [2+3] | 3 | I |
| (ii) Draw an energy profile diagram in any ortho substituted biphenyl systems. | | |
| Q.3(b) Determine the R/S configuration of the following molecules. [5] | 3 | II |



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|--|---|----|
| Q.4(a) What is circular dichroism? Explain the Cotton effect in ORD spectra. [5] | 3 | IV |
| Q.4(b) Explain octant rule with a suitable example. [5] | 4 | |

Q.5(a) Substituted pyrroles and pyridines can be made by combining to aliphatic [2.5+2.5] 4 II
 fragments represented skeletally as follows

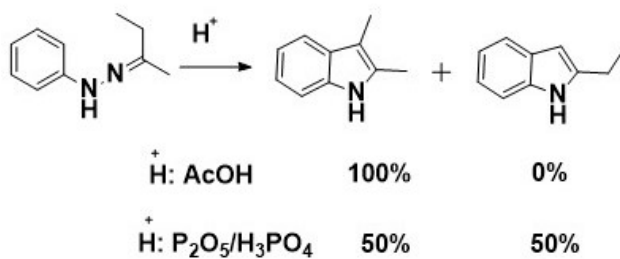


Outline the synthetic route each for pyrrole and pyridine compounds which contain the above skeletal units

Q.5(b) (I) Rationalize briefly the following facts [2+3] 5 V

i) With a suitable electrophile pyrrole undergoes much more facile electrophilic substitution than pyridine.

(II) Account for the following observation:



:::::21/11/2024 E:::::