BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO2022)

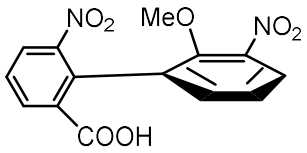
CLASS: IMSC/ MSC — **SEMESTER : IX/III**
BRANCH: CHEMISTRY — **SESSION : MO 2022**

SUBJECT: CH507 SELECTED TOPICS IN ORGANIC SYNTHESIS

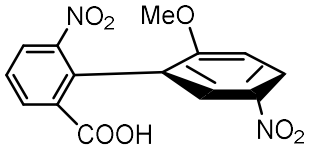
TIME: 03 HOURS — **FULL MARKS: 50**

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. **Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

1a Which one of the following biaryls will racemize faster when heated in a suitable solvent? Justify your answer. **[2]**

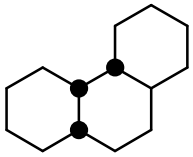


I

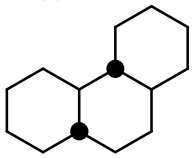


II

1b Consider the following stereoisomers of perhydro phenanthrene and answer the subsequent questions with justification wherever applicable: **[3]**



III

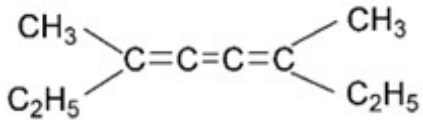


IV

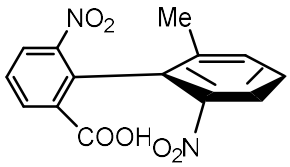
i) Draw the preferred conformations of both **III** and **IV**
ii) Which one(s) is (are) flippable?
iii) Which one(s) exists/exist as a resolvable dl-pair?
iv) What is the energy difference between the two stereoisomers? (One gauche butane interaction = 0.9 Kcal/mole)

1c Determine the absolute configurations (R/S/E/Z) for the following molecules by showing their projections and priority sequences. **[5]**

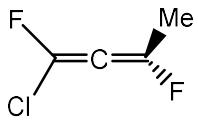
V



VI



VII



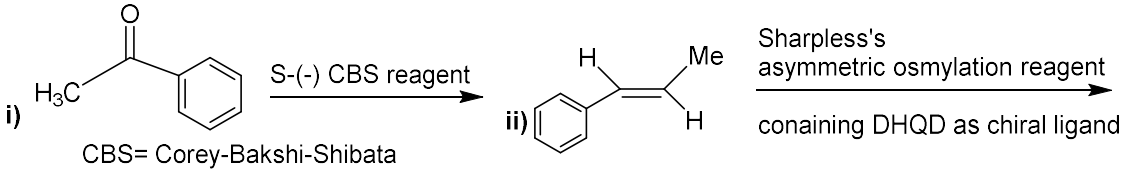
VIII

2a Define anchimeric assistance. **[2]**
2b Give one example of Intramolecular displacement by Oxygen. **[3]**
2c Describe one reaction involving neighboring group participation by σ bond with stepwise reaction mechanism. **[5]**

PTO

3a In an asymmetric reaction, the enantiomeric excess in favour of (+) isomer was found to be 60%. Calculate the ratio of the (-) and (+) isomers in the product. **[2]**

3b Write the 3D-structures of the major product obtained in the following asymmetric synthesis. **[3]**



CBS= Corey-Bakshi-Shibata

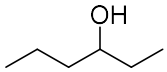
3c Consider the following Sharpless epoxidation reaction and answer the subsequent questions. **[5]**

i) Write the 3D structure of the product **P**

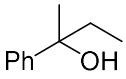
ii) Using the mnemonic, show how you have arrived at the structure

4a Explain the terms i) Retrosynthetic analysis ii) Functional Group Inter-conversion (FGI) **[2]**

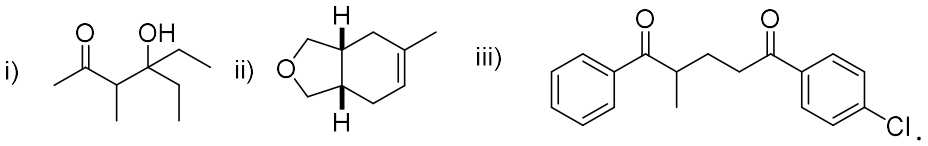
4b Discuss how you will synthesize the following target compound through synthon & synthetic equivalent strategy. **[3]**



4c Explain the possible disconnections and synthetic strategy of the following target compound. **[5]**



5a-c Write down the retro-synthetic analysis of the following compounds, synthetic scheme, with possible reagents. **[2+3+5]**



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