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

CLASS: B. PHARMACY **SEMESTER: IV**
BRANCH: PHARMACY **SESSION: SP2024**

SUBJECT: BP401T PHARMACEUTICAL ORGANIC CHEMISTRY III

TIME: 3.00 Hours **FULL MARK: 75**

INSTRUCTIONS:

1. **The missing data, if any, may be assumed suitably.**
2. **Before attempting the question paper, be sure that you have got the correct question paper.**
3. **Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.**
4. **This question paper consists of (03) three parts. Read the part wise instructions before attempting the questions.**

PART-I

Objective types questions (Instruction: Answer all questions)

Q1. (10 x 2 = 20 Marks)

A. Fill in the blanks

i) Lithium aluminum hydride ($LiAlH_4$) is a _____ reducing agent compared to sodium borohydride ($NaBH_4$)

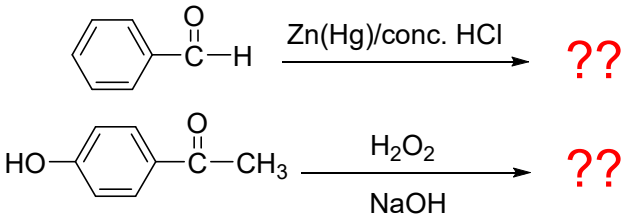
ii) A reaction in which stereochemically different molecules react differently is called _____ reaction.

B. State True or False

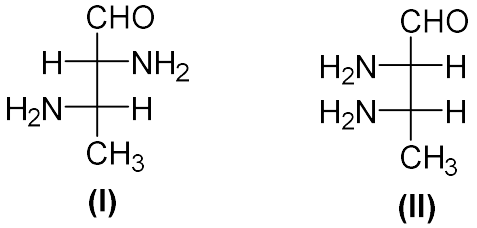
i) Five-membered heterocyclic ring undergoes electrophilic aromatic reactions faster than benzene.

ii) Pyridine is π-deficient and less reactive than benzene towards electrophilic aromatic reactions.

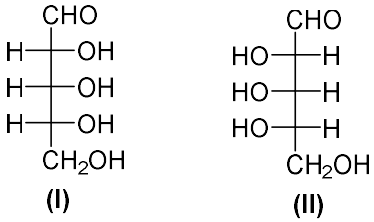
C. Write the structures of the products of the following reactions.



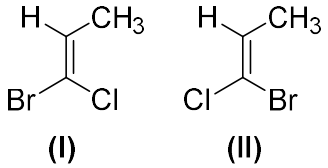
D. Write the nomenclatures of the following compounds based on the ***R*** and ***S*** configuration.



E. Identify the **asymmetric centers**, and **D** and **L** configurations of the following structures.



F. Identify the ***E*** and ***Z*** configurations of the following structures.



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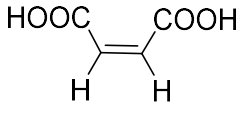
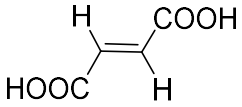
G. Which of the following isomers has a higher solubility? Give reason.

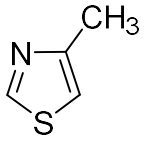


(I)



(II)

H. Write the IUPAC nomenclature of the following molecules.



(I)

(II)

I. Write the structures of the following compounds.
   a. Benzo[b]furan
   b. Benzo[c]thiophene

J. What is Amalgam? Give example.

PART-II
Short Answers
(Instruction: Answer seven out of nine questions)

(7 x 5 = 35 Marks)

Q2. Define & explain the terms Enantiomers, Diastereomers, and Meso compound. Give examples.
Q3. Distinguish between conformational and configurational isomers with examples.
Q4. Write short notes on asymmetric synthesis & its importance in pharmaceutical chemistry.
Q5. Compare the reactivity of pyridine and thiophene with benzene.
Q6. Write the mechanism of Paal-Knorr synthesis of furan.
Q7. Write the Vilsmeier-Haack reaction of thiophene.

(OR)

What is the regioselective reaction? Explain with an example of a five-membered heterocyclic ring.

Q8. Explain, with an example, the plane of symmetry (σ) and the center of symmetry (i).

(OR)

Write the mechanism of Wolff Kishner's Reduction Reaction.

PART-III
Long Answers
(Instruction: Answer two out of three questions)

(2 x 10 = 20 marks)

Q9. Using the Newman projection formula, draw the various conformations and potential energy graphs of **BUTANE for rotation about the C2-C3 bond**. Explain the relative stability of different conformers of butane.

Q10. Explain the R/S system of nomenclature with the help of the sequence rule. Give examples.

(OR)

What are optical isomers? Write the minimum requirement for compounds to show optical activity. Describe three methods for separating racemic mixtures.

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