

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

CLASS: IMSc  
BRANCH: CHEMISTRY

SEMESTER : V  
SESSION : MO/2025

SUBJECT: CH332 ORGANIC CHEMISTRY-I

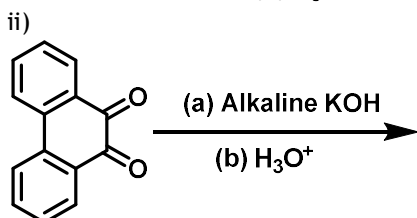
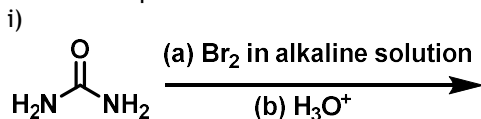
TIME: 3 Hours

FULL MARKS: 50

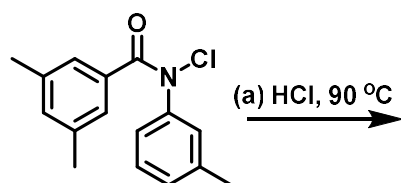
**INSTRUCTIONS:**

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.
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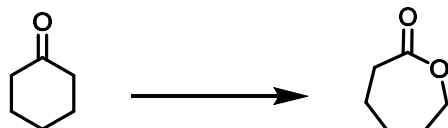
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|--|-------|----|
| Q.1(a) Demonstrate the relation of the applied magnetic field with the required radiofrequency for spin flipping in NMR. Discuss through an equation. What are the major informations obtained through the NMR analysis about the molecular structure? Explain the <sup>1</sup> H-NMR spectrum of ethanol with the approximate chemical shift and splitting. | [5] 1 | 1  |
| Q.1(b) Explain the role of chromophore on λ-shift with intensity in UV-Vis spectroscopy. Explain the identification of cis and trans isomers of Stilbene using λ <sub>max</sub> . Discuss the basic principle of IR with an example of Benzoic acid peak assignment.   | [5] 1 | 2  |
| Q.2(a) Explain the reaction mechanism for the nitration of benzene. Write the product when CH <sub>3</sub> NO <sub>2</sub> , CH <sub>3</sub> CH <sub>2</sub> NO <sub>2</sub> and (CH <sub>3</sub> ) <sub>2</sub> CHNO <sub>2</sub> treated with Br <sub>2</sub> /NaOH.   | [5] 2 | 2  |
| Q.2(b) Draw the Diazotization reaction of aniline. Explain the Nef reaction with an example and mechanism.   | [5] 2 | 3  |
| Q.3(a) Discuss the classification of Pericyclic Reaction with an example reaction of each.   | [5] 3 | 4  |
| Q.3(b) What is the FMO approach? Draw the electrocyclic interconversion of butadiene-cyclobutene. Explain the course of reaction (thermal/photochemical) and conrotatory or disrotatory mode.  | [5] 3 | 4  |
| Q.4(a) Predict the product with a reaction mechanism.  | [5] 4 | 1  |



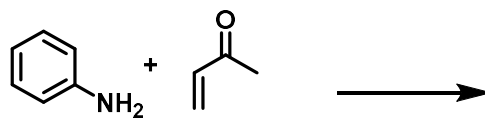
- Q.4(b) i) Predict the product with a reaction mechanism. [5] 3 3



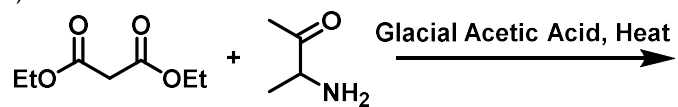
- ii) Draw the mechanism for lactum synthesis from cyclohexanone.



- Q.5(a) i) Draw a molecular orbital diagram and demonstrate the resonance structure of furan, pyrrole, and thiophene. Compare the reactivity. [5] 1 2  
ii) Identify the product and draw the reaction mechanism.



- Q.5(b) i) [5] 2 3



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