RAN-2003080204030003

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M. Sc. (Sem. - IV) Examination September - 2025

Organic Chemistry (Paper - III) Advance Organic Synthesis

Time: 3 Hours] **[Total Marks: 70**

સૂચના : / Instructions

(1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book.
(2) Figures to the right indicate full marks of the questions.
(3) All questions are compulsory.

Seat No.:

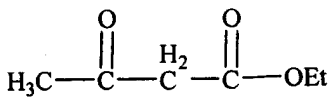
Student's Signature

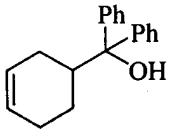
Q. 1. **Answer any Three of the following:** **(18)**

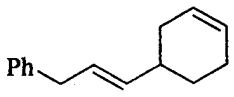
a. Describe the role of the following reagents in the protection of $-NH_2$ group
   i. Benzyloxy carbonyl chloride
   ii. Phthalic anhydride
   iii. p-Toluene sulphonyl chloride
b. What are protective groups? How –COOH group is protected using different reagents.
c. What is umpolung reaction? Explain any three methods to generate acyl anion.
d. Explain following transformation using appropriate reagents:
   i. 2, 2-Dimethylcyclohexanone → 1–(1–Hydroxy–2, 2–dimethylcyclohexyl) ethan-1-one
   ii. Pent-4-yn-l-ol → 6-Hydroxy-2-hexynoic acid

Q. 2. **Answer Three any of the following:** **(18)**

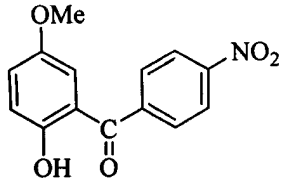
a. What is meant by retrosynthetic analysis? Giving example define the terms:
   i. TM
   ii. Synthon
   iii. FGI
   iv. Synthetic equivalent
b. Give the disconnections and plan the synthesis for the following molecules:

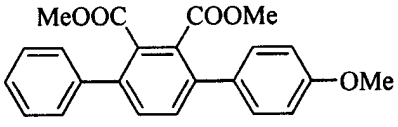
i. 

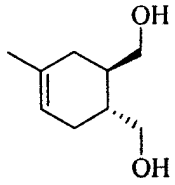
ii. 

iii. 

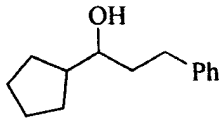
c. Do the disconnections and give the synthesis for the following molecules:

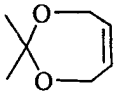
i. 

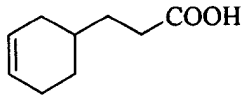
ii. 

iii. 

d. Give the disconnections and plan the synthesis for the following molecules:

i. 

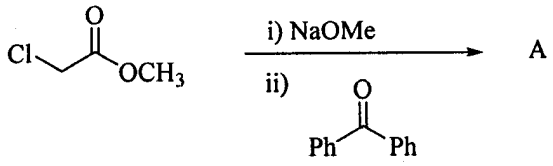
ii. 

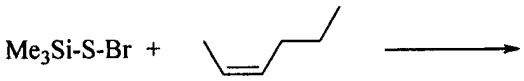
iii. 

Q. 3. Answer any Three of the following. **(18)**

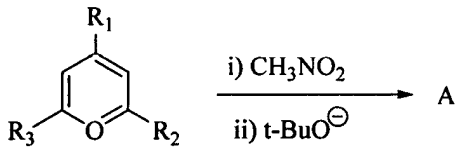
a. Give any one method for the preparations of epoxide ring. Give an account on simon-smith reaction.

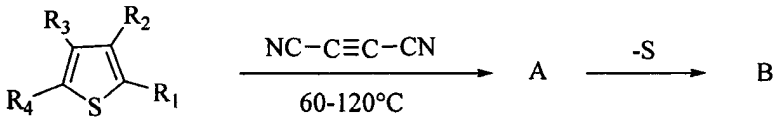
b. Complete the following steps.

i. 

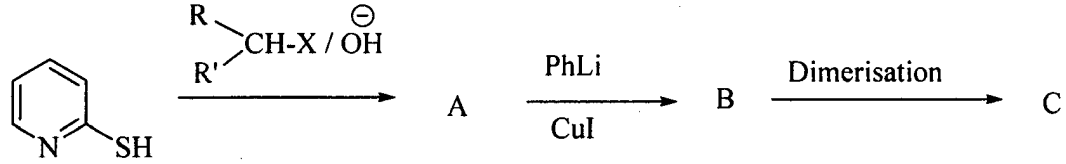
ii. 

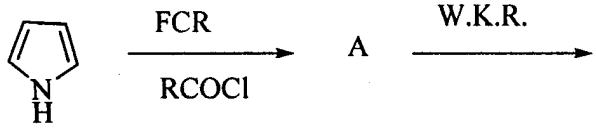
c. Complete the following with mechanism:

i. 

ii. 

d. Complete the following steps.

i. 

ii. 

Q. 4. Answer any Three of the following. **(16)**

a. Give the general methods for the preparation of dialkyl cuprate. Explain the reaction of lithium dialkyl cuprate with vinyl halide and alkyl acetate giving mechanism.

b. Enlist different methods of preparation of organolithium compounds. Discuss metal halogen exchange and transmetallation reaction.
c. Give preparation and synthetic applications of organozinc compounds.
d. Give the preparation of 9-BBN. How will you prepare the following using organoborane compounds?
   i. Amine
   ii. Tertiary alcohol
   iii. Ketone

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