D3ACH2404 **(2 Pages)** **Name: …….**
Reg. No. ……....

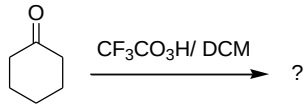
THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2025
(Regular/Improvement/Supplementary)

CHEMISTRY
FCHE3E01 - SYNTHETIC ORGANIC CHEMISTRY

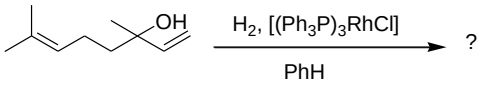
Time: 3 Hours **Maximum Weightage: 30**

Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.

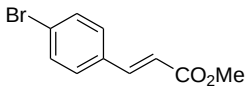
1. Predict the product of the following reaction.



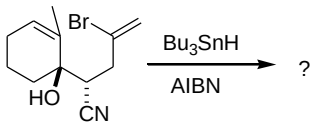
2. Draw the structure of the product from the following reaction.



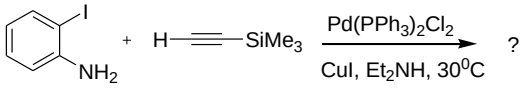
3. What is Robinson ring annulation reaction?
4. Suggest a method for the preparation of the following compound.



5. What is Wolf-Kishner reduction reaction?
6. What do you mean by donor and acceptor synthons? Give examples.
7. Enlist any two synthetic applications of $Pb(OAc)_4$.
8. Predict the product of the following reaction.



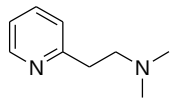
9. Draw the structure of the product from the reaction shown below.



(P.T.O.)

10. Define Functional Group Interconversion in the context of organic synthesis. Why is it an essential tool in a synthetic strategy?

11. Suggest a method for the preparation of the following compound.



12. Explain why a solution of DDQ in benzene is red and how the color change of DDQ can be used to monitor the progress of a dehydrogenation reaction?

(8 × 1 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Starting from cyclohexene how will you obtaine *trans*- and *cis*- 1,2-dihydroxy cyclohexane. Give mechanism.
14. Briefly explain the reduction reactions using diimide reagent.
15. Suggest a route to the synthesis of 3-ethylcyclohexan-1-one starting from cyclohex-2-en-1-one. Explain with mechanism.
16. Illustrate the catalytic mechanism of Kumada coupling reaction and give its synthetic applications.
17. The Wittig reaction is regiospecific but not stereospecific. Justify this statement with examples.
18. Write a note on protection and deprotection of carbonyl groups using examples.
19. Suggest a suitable mechanism for the conversion of carboxylic acid into acid amide by the action of an amine in presence of DCC.

(4 × 3 = 12 weightage)

Section C: Essay questions. Answer any *two* questions. Each carries *five* weightage.

20. Discuss the mechanism of:
    i) Suzuki-Miyaura coupling; ii) Negishi coupling;
    iii) Sonogashira cross coupling reactions.
21. a) How are Benzene Tricarbonyl Chromium prepared? Discuss briefly its synthetic applications.
    b) Discuss briefly the synthetic utility of organoboranes.
22. Discuss the mechanism of Birch reduction in: i) Anisole ii) Benzoic acid; iii) Naphthalene.
23. Discuss the synthetic routes based on retrosynthetic analysis for longifolene.

(2 × 5 = 10 weightage)