D3ACH2204 **(2 Pages)** **Name: …….**

Reg. No. ……......

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

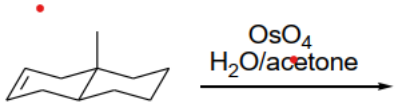
(Regular/Improvement/Supplementary)

CHEMISTRY
FCHE3E01 - SYNTHETIC ORGANIC CHEMISTRY

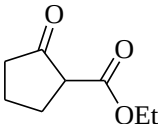
Time: 3 Hours **Maximum Weightage: 30**

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

1. Predict the major product with stereochemistry of the following reaction. Rationalize your answer by writing its mechanism.



2. What is Swern oxidation?
3. Explain with suitable example the role of phosphorous ylides in organic synthesis.
4. Explain the significance of hydroboration reactions in organic synthesis.
5. Outline the mechanism of Robinson annulations.
6. What are Mannich bases? Give any one synthetic application of Mannich bases.
7. Give one synthetic application of trimethylsilyl iodide.
8. Write the scheme for the synthesis of the following compound.



9. What is a protective group? Give an example for a protective group for carbonyl functionality.
10. Write a note on Lindlar's catalyst.
11. How will you prepare DDQ from quinone?
12. Give the mechanism of Prins Reaction.

(8 × 1 = 8 weightage)

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

13. Explain the mechanism and migrating aptitude of groups in a Baeyer-Villeger rearrangement.
14. Give an account on the catalytic hydrogenation of alkenes.
15. What are the synthetic applications of DCC?
16. Explain the importance in Lithium dimethyl cuprate reagent in organic synthesis.
17. Write a short note on conjugate addition.
18. Illustrate one group and two group C-X disconnections using suitable examples.
19. Define the following terms and give an example for each.
    (a) Synthons; (b) Synthetic equivalents; (c) FGI.

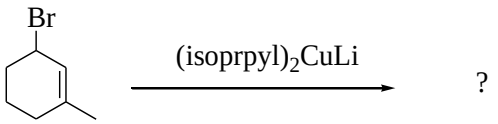
(4 × 3 = 12 weightage)

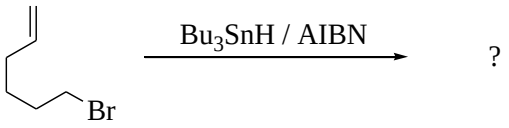
(P.T.O.)

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

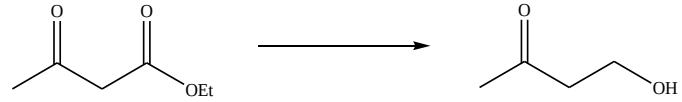
20. Describe the mechanisms of the following.
    (i) Heck reaction; (ii) Sonogashira cross-coupling reaction; (iii) Stille cross-coupling reaction; (iv) Suzuki coupling reaction; (v) Kumada coupling reaction.

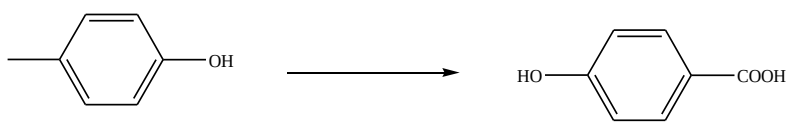
21. (a) Write the structures of the products and explain:

(i) 

(ii) 

(b) How will you effect the following transformations using protective groups?

(i) 

(ii) 

22. Explain important applications of the following synthetic reagents.
    (a) Lead tetraacetate; (b) Benzene tricarbonyl chromium; (c) PCC; (d) Tri-n-butyl tin hydride; (e) DDQ.

23. (a) Explain chemo-, regio-, and stereo- selectivities using suitable examples.
    (b) Discuss the reterosynthesis of Corey lactone.

(2 × 5 = 10 weightage)