

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(Regular/Improvement/Supplementary)

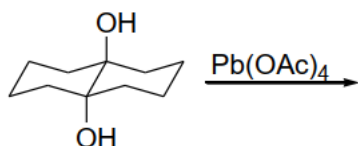
CHEMISTRY
FCHE3E01 - SYNTHETIC ORGANIC CHEMISTRY

Time: 3 Hours

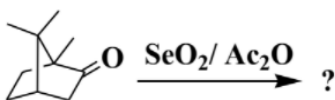
Maximum Weightage: 30

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

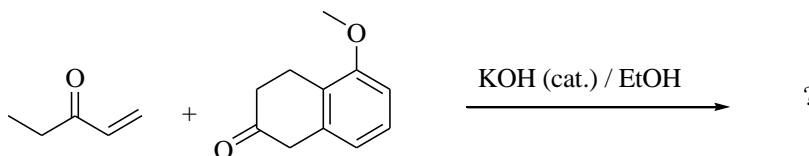
1. Giving the mechanism, predict the product of the following reaction.



2. What is Birch reduction? Give an example.
 3. Explain the significance of hydroboration reactions in organic synthesis.
 4. What is Lemieux reagent? Explain its use in organic synthesis.
 5. Write a short note on Tebbe's reagent.
 6. Identify the product formed in the following reaction.



7. Explain with suitable examples the role of phosphorus ylides in organic synthesis.
 8. Elaborate on wolff-kishner reduction.
 9. Predict the product:



10. What are Mannich bases? Give any one synthetic application of Mannich bases.
 11. Suggest suitable reagent for the conversion of 1-methylcyclohexene to 3-methyl-2 cyclohexanol.
 12. Give the products obtained on reduction of allyl *o*-bromophenyl ether by using LiAlH_4 .

(8 × 1 = 8 weightage)

(P.T.O.)

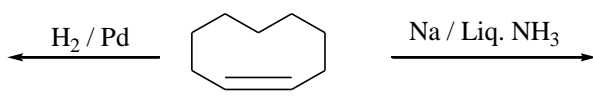
Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Write a short note on the synthetic applications of: (i) $\text{Pb}(\text{OAc})_4$ and (ii) PCC.
14. Explain the mechanism of Suzuki Coupling reaction.
15. Give an account on the catalytic hydrogenation of alkenes.
16. Discuss important synthetic applications of Gilman's reagent.
17. Illustrate with suitable mechanism the reactivity of Bu_3SnH in the presence and absence of radical initiator by taking suitable example.
18. Discuss the general principles of retrosynthesis. Explain one group and two group C-C disconnections.
19. Compare the reactivity of carbonyl compounds.

(4 × 3 = 12 weightage)

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

20. a) Discuss the selectivity in Woodward and Prévost dihydroxylations.
b) Briefly explain any three condensation reactions of carbonyl compounds.
21. a) Predict the products and write the mechanism.



b) Discuss the mechanism of:

- i) Sonogashira cross coupling; ii) Heck reaction; iii) Kumada coupling.

22. Discuss the applications of copper, chromium, silicon, lithium and boron based synthetic reagents.
23. With the aid of appropriate examples, explain the meaning of the following terms.
 - i) Target.
 - ii) Synthon.
 - iii) Synthetic equivalent.
 - iv) FGI.
 - v) Disconnection approach.

(2 × 5 = 10 weightage)