

**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**



**M.Sc. DEGREE EXAMINATION – CHEMISTRY**

**FIRST SEMESTER – NOVEMBER 2019**

**CH 1812 – ORGANIC REACTION MECHANISM & STEREOCHEMISTRY**

Date: 30-10-2019

Dept. No.

Max. : 100 Marks

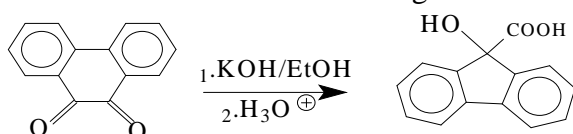
Time: 01:00-04:00

**Part-A**

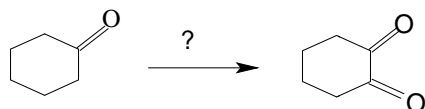
*Answer ALL questions*

**(10 × 2 = 20)**

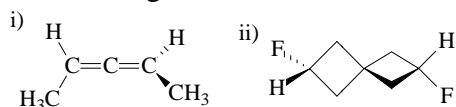
1. How is dichlorocarbene detected? Give example.
2. What is meant by partial rate factor?
3. Outline the mechanism of the following transformation.



4. What is Cope and oxy-Cope rearrangement?
5. Write any one synthetic use of NaBH<sub>4</sub>?
6. Identify the suitable reagent for the following conversion and write mechanism.



7. What is dipolar model of Cram's rule?
8. Which geometrical isomer of 1,3-dimethyl cyclohexane is resolvable and why?
9. What is second order asymmetric transformation?
10. Assign R / S configuration for the following compounds.

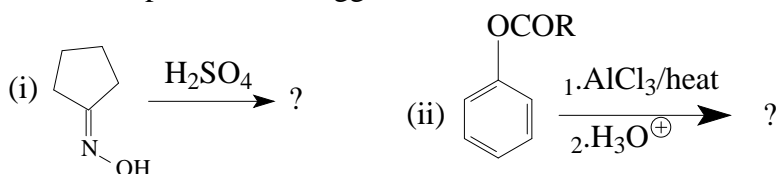


**Part-B**

*Answer any EIGHT questions.*

**(8 × 5 = 40)**

11. State and explain Hammond postulate with an example.
12. Discuss the importance of isotope labeling studies in determining the mechanism of hydrolysis of an ester.
13. Write the mechanism of von-Richter reaction and mention its uses.
14. Show the formation of intermediate in Hofmann's rearrangement and explain its reaction with an alcohol and water.
15. Explain the mechanism of Fischer's indole synthesis.
16. Predict the product and suggest a mechanism of the following reactions:



17. What is Birch reduction? Explain the effect of electron donating and electron withdrawing substituents with mechanism.
18. Discuss the acetylation reaction of *syn*- and *anti*- 7-norbornyltosylate.
19. Predict the product and explain the reaction of *cis*- and *trans*-2-aminocyclohexanol with HONO.

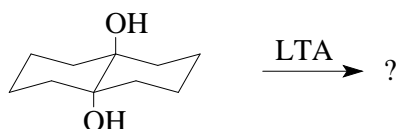
20. How is the major product in an asymmetric induction reaction predicted by using Prelog's rule?
21. Discuss the optical isomers of biphenyls and allenes.
22. Explain Curtin-Hammett principle with suitable example.

### Part-C

Answer any **FOUR** questions.

(4 × 10 = 40)

- 23a. State and explain microscopic reversibility with an example. (4)
- b. Explain the importance of the following methods of determining the reaction mechanism: (i) Identification of products (ii) Kinetic isotope effects. (3+3)
- 24a. The rate of benzoin condensation reactions,  $-d[C_6H_5CHO]/dt = k[C_6H_5CHO]^2[CN]$ . Explain the mechanistic implications of the rate law in this reaction. (6)
- b. Predict the product with mechanism. (4)



25. Write the mechanism of the following rearrangements:

- (i) Pinacol-pinacolone (ii) Wagner-Meerwin (5+5)

26a. Explain any one application of the following reagents with mechanism.

- (i) Chloranil (ii) Aluminium isopropoxide (3+3)

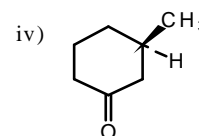
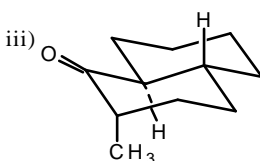
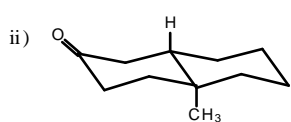
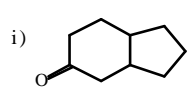
b. Write the mechanism of Clemmensen reduction with a suitable example. (4)

27a. Discuss the stereocourse of the acetolysis reaction of 2-phenyl-3-pentyl tosylate and 3-phenyl-2-pentyl tosylate.

b. Discuss the conformational analysis of 1,2 and 1,4-disubstituted cyclohexane. (5+5)

28a. Explain the kinetic asymmetric transformation reactions with suitable examples. (6)

b. Predict the Cotton effect for the following compounds. (4)



\*\*\*\*\*