D 114540 **(Pages : 3)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2024

(CBCSS)

Chemistry

CHE 1C 03—STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS

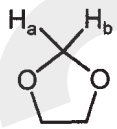
(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Section A

Answer any **eight** *questions.*
Each question carries a weightage of 1.

1. Is the statement "both HOMO and LUMO of benzene is doubly degenerate" true or false ?
2. What happens when cyclooctatetraene is treated with sulphuric acid ?
3. Give the structure of a non-classical carbocation.
4. Depict the conformation of trans-1, 3 -diethyl cyclohexane.
5. Depict the Newman projection of meso-2, 3-butanediol.
6. What product is formed when 1-chloro cyclopentane is treated with cyanide anion in DMSO solvent ?
7. Designate the topicity of H_a and H_b in :



8. Depict the structure of 2E, 4E-hexadiene.
9. Identify and show the prochiral faces of acetaldehyde.
10. Give an example of a chiral auxiliary.

(8 × 1 = 8 weightage)

Turn over

Section B

Answer any **six** *questions.*
Each question carries a weightage of 2.

11. Draw the structure of the product formed on E2 elimination of (1S, 2S)-1, 2-dichloro-1, 2-diphenylethane.

12. Give the structures of cyclodextrin and 18-crown-6.

13. Depict the most stable conformer for (i) 2-fluoro ethanol and (ii) trans-1, 4-dimethyl cyclohexane.

14. Give an example for neighbouring group participation.

15. A 3.20 g sample of morphine ($[\alpha]_D = -132°$) was dissolved in 10.0 mL of acetic acid ($[\alpha]_D = 0$). If it is put into a sample tube with a path length of 2.00 cm, what would be its observed rotation (α) ?

16. How is the Felkin-Anh model different from Crams' model ?

17. Explain atropisomerism providing a suitable example.

18. Provide structures of 2 non-carbon chiral centered molecules.

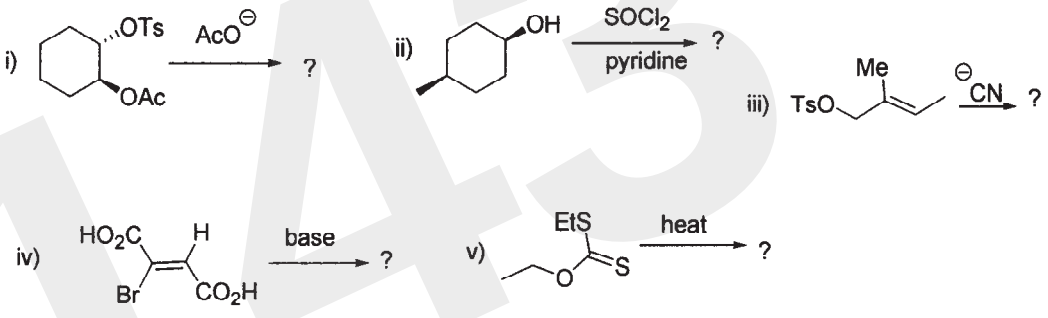
(6 × 2 = 12 weightage)

Section C

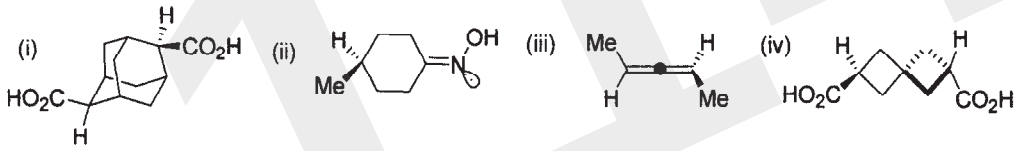
Answer any **two** *questions.*
Each question carries a weightage of 5.

19. Elimination of meso-2, 3-dibromo butane leads to trans alkene while its dl-mixture yields the cis-alkene. Justify the statement with suitable illustration.

20. Predict the products formed from the following reactions :



21. Give R/S designations for the following molecules and name the class of chirality to which they belong.



22. What are linear free energy relationships ? Explain any *one* of them in detail providing suitable example.

(2 × 5 = 10 weightage)