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Name.....

Reg. No.....

FIRST SEMESTER M.Sc. (CBCSS) [REGULAR/SUPPLEMENTARY] DEGREE EXAMINATION, NOVEMBER 2022

Chemistry

CHE 1C 03—STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS

(2019 Admission onwards)

Time : Three Hours

Maximum Weightage : 30

Section A

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

1. Depict the molecular orbitals of ethylene molecule.
2. Illustrate the tautomerism exhibited by nitro compounds.
3. Construct a reaction energy diagram for a slow endothermic reaction.
4. Draw the most stable conformer for ethylene glycol.
5. Arrange the following in increasing order of acditiy : 4-nitro benzoic acid, 4-methoxy benzoic acid, benzoic acid, phthalic acid.
6. Draw the Newman projection of the least stable conformer of 2, 3-dimethylbutane.
7. Will 1-bromo bicyclo [2.2.1] heptane undergo elimination ? Justify your answer with suitable illustration.
8. Depict the structures of (2Z, 4Z)-2, 4-hexadiene and (2E, 4Z, 6E)-2, 4, 6-octatriene.
9. (1R, 2S, 5R)-2-isopropyl-5-methlcyclohexanol is natural menthol. Depict its structure.
10. Illustrate the hydroboration reaction with an example.

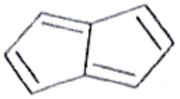
(8 × 1 = 8 weightage)

Section B

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

11. 2-Bromo fumaric acid undergoes dehydrohalogenation 50 times faster than 2-bromo maleic acid. Justify with illustration showing the elimination product also.
12. Specific rotation of a mixture of 2-bromobutanes is – 9.2°. (R)-bromobutane has a specific rotation of –23.1°. How much % R and % S enantiomer is there in the mixture ?

Turn over

13. Pentalane  has not been isolated, but its dianion is know and stab

14. Illustrate the product formed when (S)-2-butanol reacts with $SOCl_2$.

15. Predict the product formed when meso-2,3-dibromobutane is treated with mag

16. Explain the peculiar bonding in cyclopropanes.

17. Illustrate the Sharpless asymmetric epoxidation reaction.

18. Depict the structure of CBS catalyst and mention one application.

(6 × 2 = 12 w

Section C

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

19. Trans-2-amino cyclohexanol on treatment with nitrous acid yields cyclo carbaldehyde alone while the cis isomer yields cyclohexanone as well. Illustr mechanism.

20. (-) Lactic acid has a specific rotation of – 3.8°. What is the specific rotation of a containing 7.5 g. of (–)-lactic acid and 2.5 g. of (+)-lactic acid.

21. Acetolysis of threo-3-phenyl-2-butyl tosylate gives the threo racemic product while isomer proceeds largely with retention of configuration. Illustrate and explain.

22. Depict examples of (i) non-carbon chiral centred molecule ; (ii) axially chiral mo (iii) atropisomers. Also give R/S designations of the chiral molecules that you have d

(2 × 5 = 10 wei