D 52793 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2023

(CBCSS)

Computer Science

CSS 1C 03—THEORY OF COMPUTATION

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A

Answer any **four** *questions.*

Each question carries 2 *weightage.*

1. Define NFA.
2. Give a short note on minimizing deterministic finite automata.
3. What is CFG ?
4. What do you mean by turing machine computations ?
5. Define church thesis.
6. Write a brief note on the intersection with a regular language.
7. What is a Mapping Reduction ?

(4 × 2 = 8 weightage)

Part B

Answer any **four** *questions.*

Each question carries 3 *weightage.*

8. Write down the structural inductions with examples.
9. Design a regular expression for the language containing an even number of 0's followed by the odd number of 1's.
10. Explain about leftmost and rightmost derivations of CFG.

Turn over

11. Write about notations for the Turning machine.

12. Give a short note on transition diagrams for Turing machines.

13. Differentiate computability and decidability.

14. Explain the formal definition of pushdown automata.

(4 × 3 = 12 weightage)

Part C

Answer any **two** *questions.*

Each question carries 5 *weightage.*

15. Discuss about non-deterministic finite automata.

16. Explain closure properties of context-free language in detail.

17. Construct a TM for the language L = $\{0n1n2n\}$ where $n \geq 1$.

18. What are the P class and NP class in TOC ? Explain in detail.

(2 × 5 = 10 weightage)