D 32686 **(Pages : 2)** **Name.....**

Reg. No.....

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

(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. What is the inductive proof ?
2. What are the closure properties of regular languages ?
3. Brief about eliminating useless symbols.
4. Give a short note on basic model of the Turing machine.
5. What is Undecidability ?
6. Discuss about nondeterministic Turing machine.
7. Write about the parse tree.

(4 × 2 = 8 weightage)

Part B

Answer any **four** *questions.*
Each question carries 3 *weightage.*

8. Determine the central concepts of automata theory.
9. What are the closure properties of regular languages in TOC ?
10. Give two regular languages L1 and L2, how would you check if they have at least one string in common ?
11. Explain the formal definition of pushdown automata.

Turn over

12. Convert the grammar to a PDA that accepts the same language by empty stack :

$S \rightarrow aAA$

$A \rightarrow aS \mid bS \mid a$

13. Write a note on Chomsky hierarchy.

14. Write out the relationships between complexity classes.

(4 × 3 = 12 weightage)

Part C

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

15. Explain deterministic finite automata in detail.

16. Discuss finite automata with Epsilon transitions in detail.

17. Describe closure properties of recursive and recursively enumerable languages.

18. List out the types of complexity classes in detail.

(2 × 5 = 10 weightage)