D 114553 **(Pages : 2)** **Name.....**

Reg. No.....

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

(CBCSS)

Computer Science

CSS1C03—THEORY OF COMPUTATION

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A

Answer any **four** *questions.*

1. Define Finite Automata.
2. What is the reversal of a string ?
3. Define parse trees.
4. What is a multi-tape Turing machine ?
5. What is computability ?
6. Give a note on DFA.
7. Discuss about inverse homomorphism.

(4 × 2 = 8 weightage)

Part B

Answer any **four** *questions.*

8. What do you mean by deductive proofs ?
9. Write a short note on regular expressions.
10. Write the definition of context-free grammar.
11. Give a short note on the Turing machine.
12. Explain the halting problem.
13. Discuss about the cook's theorem.
14. What is computational complexity ?

(4 × 3 = 12 weightage)

Turn over

Part C

Answer any **two** *questions.*

15. Convert the following NFA to a DFA.

	0	1
$\rightarrow p$	$\{p, q\}$	$\{p\}$
q	$\{r,s\}$	$\{t\}$
r	$\{p,r\}$	$\{t\}$
$^*s$	θ	θ
$^*t$	θ	θ

16. State and prove the pumping lemma for regular languages.

17. Explain the Chomsky normal form in detail.

18. Demonstrate post correspondence problem-with suitable examples.

(2 × 5 = 10 weightage)