

22U339

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Name: .....

Reg.No: .....

**THIRD SEMESTER B.C.A. DEGREE EXAMINATION, NOVEMBER 2023**

(CBCSS - UG)

(Regular/Supplementary/Improvement)

**CC19U BCA3 C03 - THEORY OF COMPUTATION**

(Computer Application - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 3

**Part A** (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. Define Symmetric relation.
2. Define level of tree.
3. Define grammar.
4. Design a DFA all strings begins with ab.
5. Define transition systems.
6. Design a NFA all strings ending in aa.
7. Define Mealy Machine.
8. Define unreachable state.
9. Define regular set.
10. Write an ambiguous grammar.
11. Define Deterministic Pushdown automata.
12. Define Top down parsing.

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. Explain concepts of Strings with example.
14. Explain Type-1 grammar with example.
15. Explain the conversion of  $\epsilon$ -NFA to NFA with example.
16. Explain two closure properties of regular set.

17. Explain equivalence of two finite automata with example.
18. Let  $G$  be the grammar  $S \rightarrow 0B \mid 1A, A \rightarrow 0 \mid 0S \mid 1AA, B \rightarrow 1 \mid 1S \mid 0BB$ . For the string 00110101, find the derivation tree.
19. Explain Acceptance by Turing machine with example.

**(Ceiling: 30 Marks)**

**Part C (Essay questions)**

Answer any *one* question. The question carries 10 marks.

20. Prove  $1 \cdot 2 \cdot 3 + 2 \cdot 3 \cdot 4 + \dots + n(n+1)(n+2) = (n(n+1)(n+2)(n+3))/4$  using proof by induction.
21. Explain Regular expressions and Algebraic laws for regular expressions.

**(1 × 10 = 10 Marks)**

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