

21P164

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Name: .....

Reg.No: .....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2021**

(CBCSS - PG)

(Regular/Supplementary/Improvement)

**CC19P CSS1 C03 - THEORY OF COMPUTATION**

(Computer Science)

(2019 Admission onwards)

Time : 3 Hours

Maximum : 30 Weightage

**Part-A**

Answer any *four* questions. Each question carries 2 weightage.

1. Describe Alphabets and Strings in detail?
2. Explain Epsilon NFA with example.
3. Describe any 2 closure properties of regular sets.
4. Design PDA for  $\{0^m 1^m 0^n \mid m, n \geq 1\}$
5. Explain Elimination of unit productions with example.
6. Explain linear bounded automata.
7. Design a turing machine to find 2's compliment of the number.

**(4 × 2 = 8 Weightage)**

**Part-B**

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

8. Design a DFA accepting 1. substring with 0101 2.number of zeos divisible by 5.
9. Describe properties of regular expressions.
10. Describe Arden's theorom with an example.
11. State and proove Pumping lemma for context free languages.
12. Explain Closure properties of recursive and recursively enumerable languages.
13. State and prove Turing Machine Halting problem.
14. Illustrate in detail about post correspondence problem with example.

**(4 × 3 = 12 Weightage)**

### Part-C

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

15. Explain Equivalence of Deterministic and Nondeterministic Finite Automata? Construct a nondeterministic finite automaton accepting the set of all strings over  $\{a, b\}$  ending in  $aba$ . Use it to construct a DFA accepting the same set of strings.
16. Explain Myhill Nerode Theorem with example.
17. Explain in detail Turing acceptable, Turing decidable and Turing enumerable language classes.
18. Explain P and NP, NP complete, NP hard.

**(2 × 5 = 10 Weightage)**

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