

22P161

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Name:

Reg.No:

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2022

(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. Explain Language and Grammar in detail.
2. Explain language acceptability by DFA with example.
3. Prove w^nR is not regular using pumping lemma.
4. Design PDA for $\{0^m 1^n 0^n \mid m, n \geq 1\}$
5. Show that $a^n b^n$ is not context free using pumping lemma.
6. Explain any two closure properties of Context free languages.
7. Explain Closure properties of recursive and recursively enumerable languages.

(4 × 2 = 8 Weightage)

Part-B

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

8. Illustrate the equivalence of NFA and Epsilon NFA with example.
9. Describe properties of regular expressions.
10. Explain with example equivalence of two finite automata.
11. 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.
12. Design a Turing machine accepting $ww^R \in (a+b)^*$
13. Describe in detail about Reductions.
14. Illustrate in detail about P and NP, NP complete, NP hard.

(4 × 3 = 12 Weightage)

Part-C

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

15. Design a DFA accepting 1. even number of zeros and odd number of ones 2. number of zeros divisible by 3 and number of ones divisible by 2.
16. Describe DFA state minimization with example.
17. Describe in detail Turing acceptable, Turing decidable and Turing enumerable language classes.
18. Describe in brief decidability and undecidability in Turing Machine. State and prove Turing Machine Halting problem.

(2 × 5 = 10 Weightage)
