## FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023
(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 the concept of proof by contradiction. Prove $\sqrt{2}$ is irrational using proof by contradiction.

2. Describe Epsilon NFA with example.

3. Describe Right linear grammar and left linear grammar with example.

4. Design PDA for ON 12N.

5. Describe Elimination of null prioductions with example.

6. Show that an bn cn is not context free using pumping lemma.

7. Design a turing machine accepting an bn cn.

(4 × 2 = 8 Weightage)

### Part-B
Answer any *four* questions. Each question carries 3 weightage.

8. Explain about DFA and NFA with suitable example.

9. Explain how to construct the finite automaton equivalent to the regular expression with an example.

10. Explain the procedure of Myhil Nerode Minimisation.

11. Explain closure properties of Context free languages.

12. Explain Turing acceptable, Turing decidable and Turing enumerable languages.

13. State and prove Turing Machine Halting problem.

14. Explain in detail about post correspondence problem with example.

(4 × 3 = 12 Weightage)

**Part-C**

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

15. Describe Conversion of Non-Deterministic into deterministic Finite Automata with example. Construct a nondeterministic finite automaton accepting the set of all strings over {a, b} ending in abba. Use it to construct a DFA accepting the same set of strings.

16. Explain closure properties of regular sets.

17. Illustrate Church-Turing Thesis.

18. Explain P and NP, NP complete, NP hard.

**(2 × 5 = 10 Weightage)**

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