D 72943 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.A./M.Sc./M.Com. DEGREE EXAMINATION DECEMBER 2019

(CBCSS)

Computer Science

CSS 1C 03—THEORY OF COMPUTATION

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

Section A

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

1. Define Non-deterministic Finite Automata.
2. Draw DFA which accepts strings of the form $(ab)^*abb$.
3. Explain NP completeness and Cook's theorem.
4. Explain Non-deterministic Turing machine.
5. Write a regular expression for the language $L = \{ab^n w, n >= 3, w(a+b)^+\}$.
6. Explain homomorphism.
7. Define LBA.

(4 × 2 = 8 weightage)

Section B

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

8. Design an NFA which recognizes the language over {0, 1} with $\{w \in \Sigma^* | w$ contains at least two 0s, or exactly two 1s).
9. Discuss halting problem.
10. Write a note on Chomsky hierarchy.
11. Explain the properties of regular languages.
12. Explain the conversion of NFA to regular expression with an example.
13. Explain CNF and GNF with examples.
14. Construct a PDA for the Language $L = \{a^m bc^{2m} | m > 0\}$.

(4 × 3 = 12 weightage)

Turn over

Section C

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

15. With a suitable example, illustrate NFA to DFA conversion.

16. Discuss Turing acceptable, Turing decidable and Turing enumerable language classes.

17. State and prove the Pumping Lemma about the existence of Non-regular languages.

18. Discuss the properties of Context Free Languages and Deterministic Context Free Languages.

(2 × 5 = 10 weightage)