

(T)

Roll No. ....283

PAPER ID—11112

**B. Tech. EXAMINATION, 2024**

(Fifth Semester)

COMPUTER SCIENCE AND ENGINEERING

(CYBER SECURITY)

Theory of Computation

*Time : 3 Hours*

*Maximum Marks : 70*

---

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

---

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. ✓ (a) What is a Finite state automata ?
- (b) Define the language recognized by any Turing Machine.
- (c) What are the two normal forms of CFG ?  
Write their productions format.
- (d) Define Deterministic PDA.
- (e) Define the language recognized by any Turing Machine.
- (f) What are recursive languages ?
- (g) Define Derivation tree/Parse tree.

7×2=14

### Unit I

2. ✓ Explain the DFA Minimization algorithm with an example. 14
3. Demonstrate the working model of a Turing machine to perform proper subtraction. 14

## Unit II

4. Convert the following grammar to Chomsky

Normal form :

$$S \rightarrow A \mid AB0 \mid A1A$$

$$A \rightarrow A0 \mid \epsilon$$

$$B \rightarrow B1 \mid BC$$

$$C \rightarrow CB \mid CA \mid 1B. \quad 14$$

5. Prove that for every recognized by an NFA, there exists an equivalent accepting the same language L. 14

## Unit III

6. Prove that for every recognized by an  $\epsilon$ -NFA, there exists an equivalent DFA accepting the same language L. 14
7. State and Prove any *two* closure properties of Regular Languages. 14

## Unit IV

8. State and prove Greibach normal form. 14
9. State and prove Arden's Method. 14