

**BACHELOR OF TECHNOLOGY (CBCS - 2023)**  
**B. Tech. Sem-IV Computer Science & Engineering AI & ML : SUMMER : 2025**  
**SUBJECT: THEORY OF COMPUTATION**

Day : Friday  
Date : 23/05/2025

S-29279-2025

Time : 10:00 AM-01:00 PM  
Max. Marks : 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Assume suitable data **WHEREVER** necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.

Q. 1 Explain NFA, also construct NFA for strings containing '01'. (10)

OR

Q.1 Write Difference between NFA & DFA. (10)

Q. 2 Explain Pumping Lemma for Regular Languages. (10)

OR

Q. 2 Find followin regular expression to its equivalent finite automata. (10)  
a)  $10+(0+11)0^*1$  b)  $(a+b)c$  c)  $ba^*b$  d)  $a(bc)^*$

Q. 3 Explain Derivation Tree with its type. (10)

OR

Q. 3 Convert the following CFG to CNF. (10)  
 $S \rightarrow ASA|aB$   
 $A \rightarrow B|S$   
 $B \rightarrow b|\epsilon$

Q.4 Design a PDA with Instantaneous Description. (10)

OR

Q. 4 Explain Non Deterministic Push Down Automata. (10)  
 $L = \{ww^r | w \in \{a,b\}^+\}$ .

Q. 5 Design Turing machine for language having equal no of a's & b's. (10)

OR

Q. 5 Explain Church Turing Thesis. (10)

Q.6 Explain Properties of Recursive and Non Recursive language. (10)

OR

Q. 6 Explain Chomskey Hierarchy, with example. (10)

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