

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - IV Computer Science & Engineering : SUMMER : 2025
SUBJECT: THEORY OF COMPUTATION

Day : Friday
Date : 23/05/2025

S-25581-2025

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 labeled diagrams **WHEREVER** necessary.

- Q.1** Design Moore Machine (10)
If input ends with 101 output x
If input ends with 110 output y
Otherwise z
- OR**
- Q.1** Construct NFA that accept a set of all strings $\Sigma(a,b)$ contains substring of aba. (10)
Use this NFA to construct DFA accepting same set of string.
- Q.2** Design FA for following Regular Expression (10)
i) $(0+1)^*(01+10)^*$
ii) $(11+00)^* + 01^*101^*$
- OR**
- Q.2** Explain Keens theorem with example. (10)
- Q.3** Write the following definitions with example (10)
i) Elimination of ϵ Production
ii) Removal of Useless Symbol
iii) Removal of Unit Production
- OR**
- Q.3** Let G be the Grammar (10)
 $S \rightarrow aB \mid bA$
 $A \rightarrow a \mid aS \mid bAA$
 $B \rightarrow b \mid bS \mid aBB$
For string "aaabbabbba" find
i) Parse Tree ii) Is the grammar unambiguous for aababb?
- Q.4** Construct Turing Machine for well formedness of parenthesis. (10)
- OR**
- Q.4** Design TM for proper subtraction $m-n$ for $m \geq n$ and zero for $m < n$. (10)
- Q.5** Design PDA that accepting the language generated by CFG (10)
 $S \rightarrow S+S \mid S^*S \mid 4$
- OR**
- Q.5** Construct PDA for accepting the following language (10)
 $L = \{ a^n b^m c^n \mid n \geq 1, m \geq 1 \}$
- Q.6** What are the parsing techniques in compiler design? Explain in detail (10)
- OR**
- Q.6** Write the applications of Turing Machine in detail. (10)
