

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - IV Computer Science & Engineering AI & ML : WINTER : 2023
SUBJECT : THEORY OF COMPUTATION

Day : Monday

Date : 20-11-2023

W-23946-2023

Time : 02:30 PM-05:30 PM

Max. Marks : 60

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Draw neat diagrams wherever necessary.

- Q. 1 a) Construct a DFA which accepts set of all strings over {a,b} that does not end with "ab" (05)
b) Design a finite Automata to accept string starting with 'aa' and ending with 'b' (05)
consider $\Sigma = \{a,b\}$
- OR**
- Q.1 Describe moore and mealy machine (10)
- Q. 2 a) Convert the following Regular expression to its equivalent finite Automate (05)
 $10+(0+11)0^*1$
b) Write the Regular Expression for the language over $\Sigma = \{0\}$ having even length of the string (05)
- OR**
- Q.2 a) Write short note on 'Regular Expressions' (05)
b) List Rules for 'Regular Expression' (05)
- Q.3 Explain Derivation Tree and explain left most and Right most Derivation Tree (10)
- OR**
- Q.3 a) Derive the string "abb" using both left most and right most derivations using CFG (05)
given $S \rightarrow AB \mid \epsilon, \quad A \rightarrow aB, \quad B \rightarrow Sb$
b) Construct derivation Tree for string (05)
i) $id*id+id$
ii) $(id+id)*id$
 $E \rightarrow E + E$
 $E \rightarrow E * E$
 $E \rightarrow (E)$
 $E \rightarrow (E)$
 $E \rightarrow id$
- Q. 4 a) Construct the PDA accepting the following language $L = \{a^n b^n \mid n \geq 0\}$ (05)
b) Construct PDA accepting language consisting of even palindromes strings a's and b's (05)
- OR**
- Q.4 Describe push down Automata with example (10)
- Q. 5 Describe TM also explain Rules to perform operations on TM (10)
- OR**
- Q.5 a) Design TM that recognizes a string containing 'aba' as a substring (05)
b) Design TM that replaces every occurrence of 'abb' by 'baa' (05)
- Q. 6 Write short note on (10)
a) Linear Bounded Automata
b) Halting problem
- OR**
- Q.6 Explain Recursive and Recursively Enumerable language and Probabilities (10)
