

BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

Computer Science & Engineering-AI&ML

B. Tech. Sem - IV :SUMMER : 2023

SUBJECT : THEORY OF COMPUTATION

Day : Tuesday

Time : 10:00 AM-01:00 PM

Date : 23-05-2023

S-23946-2023

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) Differentiate DFA and NFA (05)
b) Explain NFA with epsilon (05)
- OR
- Q.1 a) Construct a DFA which accepts set of all strings over $\{0,1\}$, in which every '0' is followed by '1' (05)
b) Construct a DFA which accept set of all string over $\{a,b\}$ that does not end with 'ab' (05)
- Q. 2 Explain Regular expression with example (10)
- OR
- Q.2 a) List Rules for Regular expression (05)
b) Write a RE for strings that either start with '01' or end with '01' (05)
- Q.3 a) Explain Ambiguous context free grammar (05)
b) $S \rightarrow 0B|1A$,
Verify whether the grammar $A \rightarrow 0|0S|1AA|A$
 $B \rightarrow 1|1S|0BB$
Generate the string 00110101 (05)
- OR
- Q.3 Explain derivation Tree and types of Derivation Tree (10)
- Q. 4 a) Construct PDA that accept language generated by $CFG S \rightarrow S + S | S * S | 4$ (05)
b) Design PDA that checks the well formedness of parenthesis (05)
- OR
- Q.4 Describe push down Automata with example (10)
- Q. 5 a) Design TM to check whether a string over $\{a,b\}$ contains equal number of a's and 'ab' (05)
b) Design TM to increment a binary number by 1 (05)
- OR
- Q.5 Describe TM also explain rules to perform operations on TM (10)
- Q. 6 Describe in brief Recursive and Recursively Enumerable languages with properties (10)
- OR
- Q.6 Write short notes on (10)
a) Context sensitive language
b) Linear bounded automata (LBA)
