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

Day : Tuesday | Time : 10:00 AM-01:00 PM

Date : 23-05-2023 | S-25581-2023 | Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data if necessary.

Q.1 Design DFA and NFA for a language of leftmost symbol differ from rightmost symbol Σ is given by {0, 1}. **[10]**

OR

Q.1 Construct NFA and its equivalent DFA for an accepting language defined over Σ = {0, 1} such that each string has two consecutive zero's followed by 1. **[10]**

Q.2 **a)** What are the properties of Regular expression in TOC? **[05]**
b) Construct the DFA for accepting language represented by: **[05]**
$0^*1^*2^*$

OR

Q.2 Design finite Automata for following Regular expression: **[10]**
a) $01\ (1 + 10)^* + 10(0 + 01)^*$
b) $[((11)^* + 101)^*\ 01 + 0]^*\ 1$

Q.3 Explain the following terms: **[10]**
a) Removal of useless symbol
b) Removal of unit production
c) Eliminate of ∈ production

OR

Q.3 Convert the following CNF to GNF: **[10]**
$S \rightarrow bA \mid aB$
$A \rightarrow bAA \mid aS \mid a$
$B \rightarrow aBB \mid bS \mid b$

Q.4 Design Turing Machine that replaces every occurrence of abb by baa. **[10]**

OR

Q.4 Design Turing machine to check whether a string over {a, b} contains equal number of a's and b's. **[10]**

Q.5 Construct the PDA accepting the following language: **[10]**
$L = \{a^n\ b^n \mid n \geq 1\}$

OR

Q.5 Design PDA that checks the well formedness of parenthesis. **[10]**

Q.6 Explain the application of RE, FA and PDA. **[10]**

OR

Q.6 Explain the basics of parsing technique with example. **[10]**

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