BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - IV Computer Science & Engineering : WINTER : 2023

SUBJECT : THEORY OF COMPUTATION

Day : Monday

Date : 20-11-2023

W-25581-2023

Time : 02:30 PM-05:30 PM

Max. Marks : 60

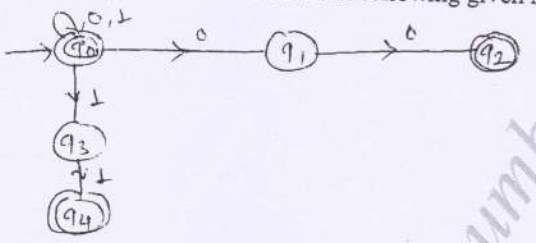
N.B.

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

Q.1 Design Mealy machine for every occurrences of 110 output A, 101 output B, Otherwise output C. **(10)**

OR

Q.1 Construct an equivalent DFA from the following given NFA **(10)**



Q.2 Draw FA for following Regular Expression **(10)**

i) $1(01+10)^* + 0(11+10)^*$

ii) $01[((10)^*+111)^* + 0]^*1$

OR

Q.2 What is regular expression? Explain Keens theorem in detail. **(10)**

Q.3 Find the CFL associated with the CFG given below **(10)**

$S \rightarrow aB \mid bA$

$A \rightarrow a \mid aS \mid bAA$

$B \rightarrow b \mid bS \mid aBB$

OR

Q.3 What is ambiguous context free grammar? Explain with example **(10)**

Q.4 Construct TM that replaces all occurrences of 011 by 100 from sequence of 0's and 1's. **(10)**

OR

Q.4 Design Turing Machine to perform addition of two unary numbers. **(10)**

Q.5 Design PDA for accepting the following language **(10)**

$L=\{ a^n b^{2m} \mid n \geq 1, m \geq 1\}$

OR

Q.5 Design PDA that accepts **(10)**

$\{wCw^R \mid w \text{ is in } (0+1)^*\}$ by empty stack

Q.6 Write the applications of Push Down Automata in detail. **(10)**

OR

Q.6 What are the applications of leftmost and rightmost derivations during parsing? **(10)**

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