BACHELOR OF TECHNOLOGY (CBCS) (2020 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-24303-2023

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

OR

Q.1 Design Moore Machine: **[10]**

a) if input ends with 101 output *x*

b) if input ends with 110 output *y*

otherwise o/p *z*

Q.2 Write the applications of Regular expression and explain closure properties of Regular expression. **[10]**

OR

Q.2 Design FA for following Regular expression: **[10]**

a) $[1(1 + 10)^* + 01\ (0 + 10)^*]^*$

b) $1^* 0 + (0 + 11)^* + 10$

Q.3 Convert the following grammar to GNF: **[10]**

$S \rightarrow ABA \mid AB \mid BA \mid AA \mid A \mid B$

$A \rightarrow aA \mid a$

$B \rightarrow bB \mid b$

OR

Q.3 Explain the following terms with example: **[10**

a) Eliminate of ϵ production

b) Removal of unit production

Q.4 Construct the PDA that accept following language: **[10]**

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

OR

Q.4 Design PDA that check well formedness of parenthesis. **[10]**

Q.5 Design Turing Machine M to recognize the language. **[10]**

$\{1^n 2^n 3^n \mid n > 1\}$

OR

Q.5 Explain in detail concept of Universal Turing machine and extensions to basic TM. **[10]**

Q.6 Explain the following terms: **[10]**

a) Applications of PDA **b)** Applications of CFG

OR

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

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