BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - IV CS&E :SUMMER- 2022
SUBJECT : THEORY OF COMPUTATION

Day : Tuesday | Time : 10:00 AM-01:00 PM
Date : 14-06-2022 | **S-24303-2022** | 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 the minimum state DFA equivalent to given DFA. **[10]**

	0	1
q0	q1	q0
q1	q0	q2
q2	q3	q1
q3	q3	q0
q4	q3	q5
q5	q6	q4
q6	q5	q6
q7	q6	q3

OR

Q.1 Design Mealy machine: **[10]**
If input ends with 100 output *x*
If input ends with 110 output *y*
Otherwise o/p *z*.

Q.2 Explain in detail closure properties of Regular languages. **[10]**

OR

Q.2 Design FA for following Regular Expression: **[10]**
a) $10\,(0 + 10)^* + 1\,(1 + 10)^*$ **b)** $0^*\,1\,(0 + 11) + 10$

Q.3 What is ambiguous grammar? Find out following CFG is ambiguos **[10]**
$S \rightarrow aS \mid \in$
$S \rightarrow aS\ bS$

OR

Q.3 **a)** Find the CFL associated with the CFG given below: **[05]**
$S \rightarrow aB + bA$
$A \rightarrow a \mid aS \mid bAA$
$B \rightarrow b \mid bS \mid aBB$
b) Write a grammar for generating string $\Sigma = \{a\}$ containing any number of a's. **[05]**

Q.4 Construct PDA accepting language consisting of even palindromes string a's and b's. **[10]**

OR

Q.4 Design PDA for accepting following language **[10]**
$L = \{a^n b^n \mid n \geq 1\}$

Q.5 What is Turing machine? Design Turing machine for 2's complement of given binary number 01010101. **[10]**

OR

Q.5 Construct Turing machine for checking well formedness of parenthesis. **[10]**

Q.6 Explain the applications of CFG in syntax analyzer phase of compiler with suitable example. **[10]**

OR

Q.6 Write the applications of following: **[10]**
a) Lexical Analyzer **b)** Text editor

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