BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)

B.Tech.Sem - IV Computer Science & Engineering : WINTER- 2022

SUBJECT : THEORY OF COMPUTATION

Day : Thursday | Time : 02:30 PM-05:30 PM

Date : 24-11-2022 | W-24303-2022 | Max. Marks : 60

N. B. :

1) All questions are COMPULSORY.
2) Figures to the right indicate FULL marks.
3) Use of non-programmable calculator is ALLOWED.
4) Assume suitable data, if necessary.

Q. 1 Construct the 3-lvevl equivalent finite automation for the finite automata given in the following table: **(10)**

Current State	a	b
$\rightarrow q_0$	q_2	q_0
q_1	q_3	q_2
q_2	q_0	q_1
$*\ q_3$	q_3	q_0
q_4	q_3	q_5
q_5	q_6	q_4
q_6	q_5	q_6
q_7	q_6	q_3

OR

Design mealy and moore machine **(10)**

if input ends with 101 output x
if input ends with 101 output y
Otherwise z.

Q. 2 Construct the Finite Automata for the regular language represented by the regular expression: **(10)**

i) $(ab + c^*)^* b$

ii) $(abc + de)^*$

OR

Write the closure properties of regular languages with example. **(10)**

Q. 3 Convert the following right linear grammar to equivalent left linear grammar: **(10)**

i) $S \rightarrow 0A$
$A \rightarrow 0A \mid \in$

ii) $S \rightarrow 0A \mid 1B$
$A \rightarrow 0C \mid 1A \mid 0$
$B \rightarrow 1B \mid 1A \mid 1$
$C \rightarrow 0 \mid 0A$

P. T. O.

OR

Write the difference between CNF and GNF. Convert the following CFG to CNF: **(10)**

$S \rightarrow bA \mid aB$

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

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

Q. 4 Design PDA accepting language consisting of even palindromes string a's and b's. **(10)**

OR

Design PDA that checks the well-formedness of parenthesis. **(10)**

Q. 5 Construct Turing Machine to compute m+n where m and n are positive integers. **(10)**

OR

Write the applications of Turing Machine with suitable example. **(10)**

Q. 6 Explain in detail Recursive and Recursively enumerable languages. **(10)**

OR

What are the basic steps in compiler? Explain in detail. **(10)**

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