B.Tech Sem – V (2007 Course) (Computer Engg.) : SUMMER - 2019
SUBJECT : THEORY OF COMPUTATION

Day : Saturday

Date : 11/05/2019   S-2019-3063

Time : 10.00 AM TO 01.00 PM

Max. Marks : 80

N. B. :

1) **Q. No. 1** and **Q. No. 5** are **COMPULSORY**. Out of remaining attempt **ANY TWO** question from Section – I and Section – **II**.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in *SAME* answer books.
4) Draw neat and labeled diagram **WHEREVER** necessary.
5) Assume suitable data, if necessary.

SECTION - I

Q. 1 **a)** Differentiate between Natural And Formal languages.   **(05)**

b) Give the steps for Mealy to Moore conversion with example.   **(05)**

c) Define: **(04)**

    i) Chomsky normal form
    ii) Greibach normal form

Q. 2 **a)** Design an FSM for divisibility by 3 tester for decimal numbers.   **(08)**

b) Explain in detail equivalence of NFA and DFA.   **(05)**

Q. 3 **a)** Construct a Moore machine to find out the residue-modulo-3 for binary numbers.   **(07)**

b) Design a Mealy machine for incrementing the value of any binary number by one.   **(06)**

Q. 4 **a)** Write the grammar generating all strings consisting of a's and b's with at least two a's.   **(08)**

b) Explain ambiguous context free grammar, also give the details of removal of ambiguity.   **(05)**

SECTION - II

Q. 5 **a)** Give in detail equivalences of CFG and PDA.   **(04)**

b) What is the instantaneous description of a Turing Machine.   **(05)**

c) Explain text-search utility in detail with respect to application of RE.   **(05)**

Q. 6 a) Define pushdown stack-memory machine. Give its pictorial representation **(06)**
also differentiate FA v/s PDA.

b) Design a PDA that checks for well formed parentheses. **(07)**

Q. 7 a) Design a Turing machine that replaces all occurrences of '111' by '101' from **(07)**
a sequence of '0's and '1's.

b) Compare FSM and TM. **(06)**

Q. 8 Write short notes on: **(13)**
a) Applications of CFG
b) Applications of PDA
c) Applications of RE and FA

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