Code No: 5458AQ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech II Semester Examinations, June/July - 2019
THEORY OF COMPUTATION
(Computer Science and Engineering)

Time: 3hrs   Max.Marks:75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question
carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Give recursive definition for Regular Expression.   [5]
  b) Write a CFG for EVEN palindromes.   [5]
  c) Define Turing Machine.   [5]
  d) What do you mean by Turing Reducibility? Explain briefly.   [5]
  e) State the CooK-Levin Theorem. Discuss briefly.   [5]

PART - B

5 × 10 Marks = 50

2.a) Design NFA to accept strings with 0's and 1's such that the string ends with 00.
  b) Design DFA to accept strings with c and d such that number of **d**'s are divisible by 4.
                                                                           [5+5]
OR

3. Construct an NFA for the following:
   a) R=01[((10)*+111)*+0]*1
   b) ((01+10)*00)*   [5+5]

4.a) Write the Context Free Grammar for L = {$a^n b^n \mid n \geq 1$ }.
  b) Design Push Down Automata for the language L={ $ww^R \mid w \in (0+1)^*$}.   [5+5]
OR

5.a) Convert the following grammar to Chomsky Normal Form and simplify the grammar.
       S→ ABA
       A→aA | ϵ
       B→bB| ϵ
  b) Show that L ={$a^n b^n c^n \mid n \geq 1$} is not CFL.   [5+5]

6. Design Turing Machine L={$a^n b^n c^n \mid n \geq 1$}.   [10]
OR

7. Design Turing Machine which recognizes following language.   [10]
       L = { $0^n 1^n \mid n >= 1$}

8. What is decidability? Explain at least 4 decidable problems.   [10]
OR

9. What do you mean by Halting Problem of Turing Machine? Discuss briefly.   [10]

10. Explain the following problems and also state which type of problems they are?
a) Traveling Salesperson Problem.
b) Vertex Cover Problem. [5+5]

OR

11. Explain about
a) NP Problem
b) P Problem [5+5]

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