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Roll No .....

CS-227

B.E. IV Semester

Examination, June 2017

Choice Based Credit System (CBCS)

Theory of Computation

Time : Three Hours

Maximum Marks: 60

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Construct a Finite Automaton accepting all string over {0, 1}
   i) Having odd number of 0's
   ii) Having even number of 1's and even number of 1's.
   b) Explain Finite Automaton and its various types.

2. a) Construct an NFA for the regular expression (0*(10+01)*11)*.
   b) State and prove the pumping lemma for regular sets.

3. Find a grammar in GNF equivalent to the following grammar G

$S \rightarrow AA|a$

$A \rightarrow SS|b$

4. Explain with example Chomsky Normal Form and GNF Forms?

5. a) Construct a PDA for accepting language

$L=\{a^n b^n \, n \geq 1\}$ by the Null stack.

   b) Construct a PDA equivalent to the following grammar

$S \rightarrow OBB$

$B \rightarrow OS|IS|O$

Test whether 010^4 is in N(A).

6. Construct the CFG corresponding to PDA,

$A=(\{q_0,q_1\},\{a,b\},\{a,z_0\},\delta,q_0,z_0,\phi)$ and δ is given by

$\delta(q_0,a,z_0)=(q_0,az_0)$

$\delta(q_0,a,a)=(q_0,aa)$

$\delta(q_0,b,a)=(q_1,a)$

$\delta(q_1,b,a)=(q_1,a)$

$\delta(q_1,a_1,a)=(q_1,n)$

$\delta(q_1,n_1,z_0)=(q_1,n)$

7. a) Write the closure property of Regular expression.
   b) Explain Melay and Moore machines.

8. Write short notes on (any two):
   a) Tractable and untractable problem.
   b) Turing machine
   c) Recursive and Recursively enumerable language.

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