Reg No.										

प्रज्ञानं ब्रह्म
Manipal
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MANIPAL INSTITUTE OF TECHNOLOGY
(Constituent Institute of Manipal University)
MANIPAL-576104

FIFTH SEMESTER B.E. (CSE) MAKE-UP EXAMINATION
SUBJECT: THEORY OF COMPUTATION **(CSE-301)**
JAN -2009
(REVISED CREDIT SYSTEM)

TIME : 03 HOURS MAX.MARKS : 50

Instructions to Candidates

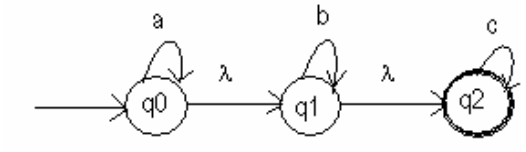
- Answer ANY FIVE FULL questions.
- Missing data can be suitably assumed.

1A.Show an automaton for 2 bit serial binary adder (3)

1B. Use induction on *s* to show that if *s* is a positive set , prove that $|2^s| = 2^{|s|}$ (3)

1C. Draw a DFA to accept a strings of *a*'s and *b*'s having not more than 3 *a*'s and having substring *aa*. (Include transition table also) (4)

2A. Convert the following NFA to DFA and Final state is q2 (4)



2B. Obtain a regular expression to accept string of *a's* and *b's* starting with '*a*' and ending with '*b*'. (2)

2C. Obtain a NFA for the regular expression (a+b)*aa(a+b)* (4)

3A. State and prove the theorem pumping lemma for regular languages with one example. (3)

3B. Find a simple grammar for the regular expression aaa*b +b (3)

3C. Convert the following grammar into GNF (4)

S→AA | 0

A→SS | 1

4A. Obtain a PDA to accept a string of balanced parentheses. The parentheses to be considered are (,),[,] . Show the ID for the same. (3)

4B. Obtain the PDA for the given grammar and show the acceptances of the string. (4)

S→ aSa |aa

S→ bSb | bb

4C. State and prove the theorem , how CFL's are closed under union and concatenation. (3)

5A. Give the definition of TM with neat diagram (2)

5B. Show TM as transducer with one appropriate example with its ID. (4)

5C. Explain the models of TM (4)

(i) TM with stay option

(ii) Offline TM

(iii) Multitape TM

6A. Explain Universal TM (10)

6B. What is recursively enumerable language and recursive language

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