SVKM's NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: B. Tech (COMP) Year: III Semester: V
Batch: 2013-14

Academic Year: 2014-2015

Subject: **Theoretical Computer Science**

Date: 08/06/2015

Marks: 100
Time: 10.00 am to 1.00 pm
Durations: 3 (hrs)

Re-Examination

Instruction: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

NB:

1) **Question No. 1 is compulsory.**
2) Out of remaining questions, attempt any **Four** questions.
3) In all **Five** questions to be attempted.
4) All questions carry equal marks.
5) Answer to each new question to be started on a fresh page.
6) Figures in brackets on the right hand side indicate full marks.

Q. 1	a)	Draw DFA to accept strings over alphabet {0,1} such that i) number of 0's is even and number of 1's is also even ii) neither 00 nor 11 as substring	10
	b)	Using pumping lemma for regular sets, prove that $L=\{0^i1^{2i} \mid i>0\}$ is not regular	10
Q.2	a)	Convert following grammar to CNF S→ ASB|ε A→AaS|a B→SbS|A|bb	10
	b)	Design a Moore machine that gives an output 1if input string ends in bab	10
Q. 3	a)	Explain applications of regular expressions and context free grammar	10
	b)	Design PDA to accept $(ab)^n(cd)^n$	10
Q. 4	a)	Design turing machin to find 2's complement of binary number	10
	b)	Let G=(N, T, P, S) be the CFG having following set of production rules S→ aAS|a A→ SbA|SS|ba Derive the string 'aabbaa' using leftmost derivation and rightmost derivation. Also draw parse tree.	10
Q. 5	a)	Explain different types of grammar defined by Chomsky hierarchy	10
	b)	Construct NFA from following RE (0+1)*(00+11) and then convert it into minimized DFA	10
Q. 6	a)	Explain properties of context free languages	10

	b)	Design divisibility by 3 tester for decimal numbers using FSM	10
Q. 7		Write short notes on following	20
	a)	Properties of Regular Languages	
	b)	Universal Turing machine	
	c)	Post correspondence problem	
	d)	Compare and contrast Moore and Mealy machine	