SVKM's NMIMS

MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Programme: B. Tech (COMPUTER)   Year: III   Semester: V

Academic Year: 2018-2019

Subject: Theoretical Computer Science

Date: 24 November 2018

Marks: 60
Time: 10.00 am to 1.00 pm
Durations: 3 (hrs)
No. of Pages: _____2_____

Re-examination (2014-15/ 2015-16/ 2016-17)

Instructions: Candidate should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.
 1) Question no. 1 is compulsory.
2) Out of remaining questions, attempt any 4 questions.
3) in all five questions to be attempted.
4) Answer to each new question to be started on a fresh page.
5) Figures in brackets on the right hand side indicate full marks.
6) Assume suitable data if necessary.

Q.1	a)	Construct epsilon NFA for the regular expression (0(0+1)*01)	4M
	b)	Compare Moore and Mealy machine	4M
	c)	State and prove pumping lemma for regular languages	4M
Q.2	a)	Explain the terms Recursive language and recursively enumerable language with example	6M
	b)	Explain Post correspondence problem with example	6M
Q.3	a)	Convert following grammar to CNF $S \to ASB \mid \varepsilon$ $A \to AaS \mid a$ $B \to SbS \mid A \mid bb$	6M
	b)	Design PDA to accept the language $L = a^n b^n$	6M
Q.4	a)	Design divisibility by 5 tester for decimal numbers using finite automata	6M
	b)	Let $G=(N, T, P, S)$ be the CFG having following set of production rules $S \to aAS \mid a$ $A \to SbA \mid SS \mid ba$ Derive the string 'aabbaa' using leftmost derivation and rightmost derivation. Also draw parse tree.	6M
Q.5	a)	Design turing machine to accept the language containing equal number of a's and b's. $\sum = \{a,b\}$	6M
	b)	Explain halting problem in turing machine	6M
Q.6	a)	Explain different types of grammars with example	6M

b) Design mealy machine to find 2's complement of a number and covert it to Moore machine   6M

Q.7   a) Explain Rice's theorem   4M
     b) Explain post correspondence problem with example   4M
     c) Explain properties of regular language   4M