Code No. 9112

FACULTY OF ENGINEERING

B.E. 3/4 (CSE) I – Semester (Main) Examination, Dec. 2014 / Jan. 2015

Subject: Automata Languages and Computation

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1 Construct DFA that accepts all strings of a's and b's where each string starts with 'a' and ends with 'ab' over alphabet {a,b}. 3

2 State pumping lemma for regular languages. 2

3 Consider the following grammar: 3

$S \rightarrow ABa / bC$

$A \rightarrow BC / b$

$B \rightarrow b / \in$

$C \rightarrow c / \in$

Eliminate $\in$-productions.

4 Define PDA and the languages accepted by a PDA. 2

5 What do you understand by the term LBA? Explain. 3

6 Define PCP and MPCP. 3

7 Construct left linear grammar for $(0+1)^*00(0+1)^*$ 3

8 Design finite state automata for $(0^* 1^*)^*$. 2

9 State Church's hypothesis. 2

10 Mention the ID format of a TM. 2

PART – B (50 Marks)

11 a) Construct a DFA 6

		O	1
$\rightarrow$	q_0	$\{q_0, q_1\}$	$\{q_0\}$
	q_1	ϕ	$\{q_2\}$
	q_2	ϕ	$\{q_3\}$
*	q_3	$\{q_3\}$	$\{q_3\}$

b) Construct an NFA equivalent to the regular expression 10 + (0+11) 0*1 with $\in$-transitions. 4

…2.

12 Minimize the following DFA 10

	O	1
→ A	B	E
B	C	F
* C	D	H
D	E	H
E	F	I
* F	G	B
G	H	B
H	I	C
* I	A	E

13 Convert the following grammar into GNF. 10

S → AA / O

A → SS / 1

14 a) Design a TM to accept $a^n b^n$ / n ≥ 1. 5

b) Construct a PDA equivalent to the following grammar. 5

S → aB/bA

A → a/aS/bAA

B → b/bS/aBB

15 Show the PCP with two lists X = (b, bab^3, ba) and Y = (b^3, ba, a) has a solution. Give the solution sequence. 10

16 a) Explain various types of Turing Machines. 5

b) Prove that (00*)*1 = 1 + 0 (0 + 10)* 11. 5

17 Give short notes on: 10

a) CHOMSKY hierarchy

b) Undecidability.

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