The Open University of Sri Lanka
B.Sc. Degree Programme –Level 05
Department of Mathematics and Computer Science
Final Examination -2013/2014
CSU3275/PMU3293/PME5293: Automata Theory
Duration Three hours

Date: 28th November 2014	**Time: 1.30pm-4.30pm**

Answer Four Questions only

01.(a) Let $\sum$ be an alphabet (that is, a finite set of symbols) and a $\in \sum$ Explain the meaning of a^* and $\sum^*$.

(b) State whether each of the followings is true or false.

(i) $abb \in b^*a^*b^*a^*$

(ii) $abcd \in (a(cd)^*b)^*$

(iii) $101 \in ((00)^*1^*(10)^*(11)^*(01)^*)^*$

(c) Check whether the languages represented by the following expressions are identical or not. Justify your answer.
(i) (0*∪ 1*) and (0 ∪ 1)*
(ii) (0*∪ 1*)* and (0 ∪ 1)*

02. (i) Define a Deterministic finite automation (DFA).

(ii) Define the language accepted by a DFA.

(iii) Draw the directed graph that describes the DFA with the following state transition table.

States	Inputs	
	a	b
A	B	D
B	C	D
C	C	C
D	B	D

Initial state : A Accepting state: D

(iv)Which of the following strings are accepted by the DFA given above?

(a) aabb (b) abb (c) bbab (d) bbaabaa

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03. I (a) Define Mealy type sequential machine.

(b) Define Moor type sequential machine.

(c) Compare Mealy type sequential machines and Moor type sequential machines.

II. Consider the flow table given below.

State	Inputs		Outputs
	0	1	
0	0	2	0
1	0	2	1
2	1	3	0
3	1	3	1

(a) What is the type of this machine?
(b) Draw the state graph for this machine.

III. Draw a DFA to accept strings of 0's and 1's ending with the string 011.

04. (a) Define the following terms.

If A be a nonempty set. Then a binary relation R in A is said be a

(i) Partial order

(ii)Total Order

(iii)Equivalence Relation

(iv)Equivalence Classes

(b) (i) What do you mean by a Hasse Diagram

(ii) Draw a Hasse Diagram for the poset ({1,2,3,4,5,6} |)

05. (i) What do you mean by finite automata?

(ii) What are the special characteristics of Non –Deterministic Finite Automata ?

(iii) Describe the difference between NDFA and DFA.

(iv) Construct a DFA that accepts strings over the alphabet {0,1} that have at least one (1)and an even number of 0s after the last1.

06. (i) Define a SP-Partition.

(ii) State the parallel Decomposition theorem.

(iii) Identify 3 SP-Partitions from the table given below with proper justification.

State transition
(σ)

S/I	0	1
1	2	3
2	1	3
3	4	5
4	3	2
5	1	6
6	1	5