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**B. E. 4th Semester (CSE) Examination,
May-2013**

THEORY OF AUTOMATA & COMPUTATION

Paper- CSE-206-E

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions. All questions carry equal marks.

1. Design Turing Machine for $L = \{ 0^n 1^n 0^n \mid n \geq 1 \}$ 20
2. (a) Construct a Mealy machine which is equivalent to the Moore machine given in table

Present State	Next State		Out put
	a = 0	a = 1	
$\rightarrow q_0$	q_3	q_1	0
q_1	q_1	q_2	1
q_2	q_2	q_3	0
q_3	q_3	q_0	0

- (b) Construct the corresponding Mealy machine to the Moore machine described by the transition table given : 10,10

Present State	Next State		Out put
	a = 0	a = 1	
$\rightarrow q_1$	q_1	q_2	0
q_2	q_2	q_3	0
q_3	q_3	q_3	1

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3. Design Push Down Automata for $L = \{a^{2n}b^n \mid n \geq 1\}$. 20
4. (a) Define String, Alphabet and Language.
(b) Prove that if $\delta(q, x) = \delta(q, y)$, then $\delta(q, xz) = \delta(q, yz)$ for all strings z in Σ^+ .
(c) Construct DFA and NFA accepting the set of all strings with three consecutive 0's. 6+8+6
5. Write about the following :
(a) Linear-Bounded Automata
(b) Context-Sensitive Language
(c) Decidability of PCP. 5+5+10
6. Convert the following grammar to Greibach Normal Form $G = (\{A_1, A_2, A_3\}, \{a, b\}, P, A)$
Where P consists of the following :
 $A_1 \rightarrow A_2 A_3$
 $A_2 \rightarrow A_3 A_1 \mid b$
 $A_3 \rightarrow A_1 A_2 \mid a$.

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7. (a) Construct a regular grammar which can generate the set of all strings starting with a letter (a to z) followed by a string of letters of digits (0 to 9).
- (b) Construct a finite automation accepting all strings over $\{0,1\}$ ending in 010 or 0010. 10,10
8. (a) Construct a grammar G generating $\{xx \mid x \in \{a,b\}^*\}$
- (b) Construct a grammar generating $L = \{wcw^R \mid w \in \{a,b\}^*\}$. 10,10