

24266

B.Tech. 5th Semester (Computer Science & Engg.)

Examination, December-2012

THEORY OF AUTOMATA COMPUTATION

Paper-CSE-305-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions.

1. Explain the following :

- (a) Partial function
- (b) Define Regular Expression
- (c) Limitation of FSM
- (d) Relation between languages
- (e) What do you mean by Σ^+
- (f) Define ambiguity.
- (g) What do you mean by PCP
- (h) Define NFA and DFA mathematically
- (i) Explain the ID in turing machine
- (j) Application of PDA.

10×2=20

2. (a) Explain NFA significance and function. Convert the given Finite Automata into its Deterministic. Explain the method used. Taking given example prove both accept the same string.



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- (b) Construct finite Automata to accept the regular expression $(0+1)^* (00+11) (0+1)^*$. Also discuss method used.

8

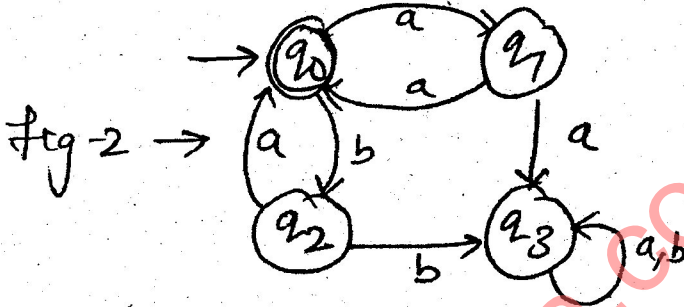
3. (a) Define Mealy and Moore Machine ? Construct a Mealy machine equivalent to the Moore Machine given by the following table 4

table 4

	a = 0	a = 1	o/p
	q_{i+1}	q_{i+1}	
q_0	q_1	q_2	1
q_1	q_3	q_2	0
q_2	q_2	q_1	1
q_3	q_0	q_3	1

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- (b) Construct the regular Expression accepted by the following Automata in fig. 2



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4. (a) List out closure properties of Regular sets. Also Discuss Proof. 10

- (b) What is Pumping Lemma ? Prove that

$$L = \{1^n \mid n \geq 0\} \text{ is not regular.} \quad 10$$

5. (a) Convert the following to GNF $S \rightarrow AB, A \rightarrow BS/b,$

$$B \rightarrow SA, A \rightarrow b$$

$$B \rightarrow a$$

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- (b) Define CFG and give examples. What is CFL generated by Grammar $S \rightarrow abB, A \rightarrow aaBb$

$$B \rightarrow bbAa, A \rightarrow \epsilon \text{ (epsilon)} \quad 8$$

6. What do you mean by PDA ? How PDA are different from FA with the help of TD ? Also discuss some applications of PDA. Design a PDA for Balanced parentheses with transition diagram of PDA (TD) and test the string (()). 20
7. Explain the ID and move of a Turing Machine ? Indicate the major differences between Turing Machine and PDA. Design Turing Machine to accept the language $L = \{0^n 1^n \mid n \geq 1\}$ 20
8. (a) Construct a grammar for the language $L = \{0^i 1^{2i} \mid i \geq 1\}$ 6
- (b) Discuss the Chomsky Hierarchy of Grammars. Also determine the type of the Grammar G which consist the productions
- (a) $S \rightarrow aA, A \rightarrow aAB, B \rightarrow b, A \rightarrow a$
- (b) $A \rightarrow aB, B \rightarrow aA, B \rightarrow b, A \rightarrow a$
- (c) $S \rightarrow aAB, AB \rightarrow bB, B \rightarrow b, A \rightarrow aB$
- (d) $S \rightarrow aAB, AB \rightarrow C, A \rightarrow b, B \rightarrow AB$ 14
9. (a) What is meant by recursive and recursively enumerable languages ? Prove that if language L and its complement I are both recursively enumerable then L is recursing. 14
- (b) Discuss Bimiting function in detail. 6