Printed Pages : 4

Roll No. .....

322554(22)

BE (5th Semester)
Examination, Nov.-Dec., 2018

(New Scheme)

Theory of Computation

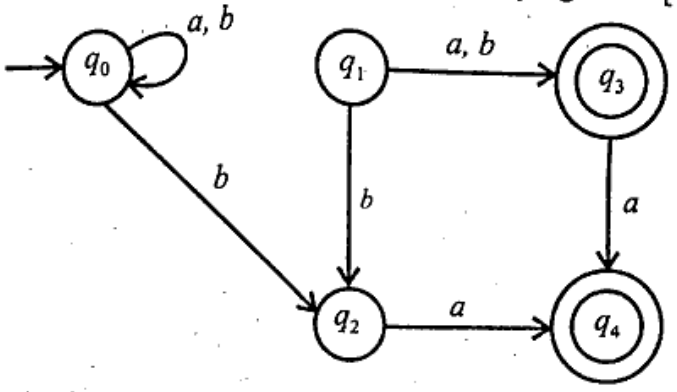
Time Allowed : 3 hours | *Maximum Marks* : 80
Minimum Pass Marks : 28

Note : (*i*) Part (*a*) of each question is compulsory. Attempt any **two** parts from (*b*), (*c*) and (*d*).
(*ii*) The figures in the right-hand margin indicate marks.

Unit-I

1. (*a*) Define Mealy and Moore machine. [2]

(*b*) Construct a DFA equivalent to the NDFA M where transition diagram is given by figure. [7]



(*c*) Construct a Moore machine equivalent to the Mealy machine M defined by the table : [7]

	$a = 0$		$a = 1$	
	State	*Output*	*State*	*Output*
$\rightarrow q_1$	q_1	1	q_2	0
q_2	q_4	1	q_4	1
q_3	q_2	1	q_3	1
q_4	q_3	0	q_1	1

(*d*) Define Myhill Nerode theorem. Explain the properties of FSM. [7]

Unit-II

2. (*a*) Write the statement of Arden's theorem. [2]

(*b*) Construct finite automata equivalent to the regular expression

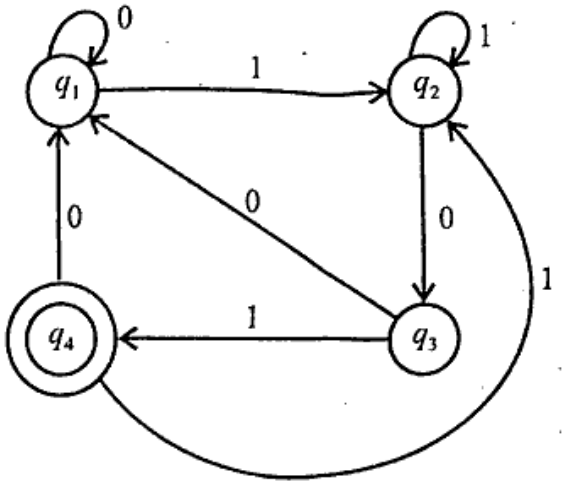
$$(0 + 1)^* (00 + 11) (0 + 1)^*$$ [7]

(c) Construct a regular grammar generating the regular set represented by

(i) $P = a^*b(a + b)^*$

(ii) $P = a(a + b)^* ab$ [7]

(d) Find the regular expression for the following automation. [7]



Unit-III

3. (a) Define derivation and language. [2]

(b) (i) Let $G = (\{S, C\}, \{a, b\}, P, S)$ where P consists of $S \rightarrow a\,Ca$, $C \rightarrow a\,Ca \mid b$. Find $L(G)$. [4]

(ii) If G is $S \rightarrow aS \mid bS \mid a \mid b$, find $L(G)$. [3]

(c) Construct a reduced grammar equivalent to the grammar

$S \rightarrow aAa, A \rightarrow Sb \mid bCC \mid DaA$

$C \rightarrow abb \mid DD, E \rightarrow aC, D \rightarrow aDA$ [7]

(d) Construct a grammar like Greibach normal form

$S \rightarrow AA \mid a, A \rightarrow SS \mid b$ [7]

Unit-IV

4. (a) Define Npda and Dpda. [2]

(b) Explain the acceptance by pda. [7]

(c) Construct a pda A accepting the set of all strings over $\{a, b\}$ with equal number of a's and b's. [7]

(d) Design a TM that accepts

$\{0^n\,1^n \mid n \geq 1\}$ [7]

Unit-V

5. (a) Define initial function. [2]

(b) Construct a TM that can construct the zero function Z. [7]

(c) Write short notes on : [7]

(i) Computability

(ii) A Turing Model for computation

(d) Show that $f(x, y) = x * y$ and $f(x, y) = x^y$ is primitive recursive function. [7]

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