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B. E. (Fifth Semester) Examination, April-May 2016

(New Scheme)

(CSE Engg. Branch)

THEORY OF COMPUTATION

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : *Subquestion (a) is compulsory from each unit. Solve any two out of subquestions (b), (c), (d) from each unit.*

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1. (a) Write the Tuple Representation of FA. 2

(b) Construct a DFA equivalent to the following NFA : 7

Present State	Next States		
	a	*b*	*c*
$\rightarrow q_0$	$\{q_1, q_4\}$	$\{q_4\}$	$\{q_2, q_3\}$
q_1	—	$\{q_4\}$	—
q_2	—	—	$\{q_2, q_3\}$
(q_3)	—	$\{q_4\}$	—
q_4	—	—	—

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(c) Construct a Moore machine equivalent to the Mealy Machine : 7

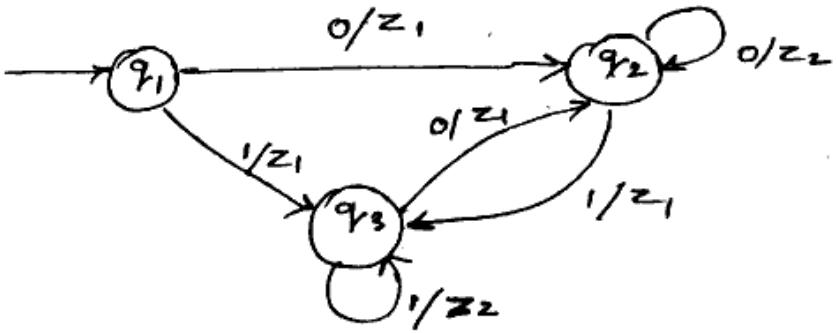

fig.

(d) Construct a FA for the set of strings w over $\{a, b\}^*$ such that w ends in the substring ab.

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2. (a) Describe the following set by regular expression {0, 00, 000, ...}. csvtuonline.com 2

(b) Convert the regular expression $1 + (0+11)0*1$ into its equivalent NDFA. 7

(c) Describe Pumping Lemnca for regular sets. 7

(d) Construct a regular grammar equivalent to the DFA. 7

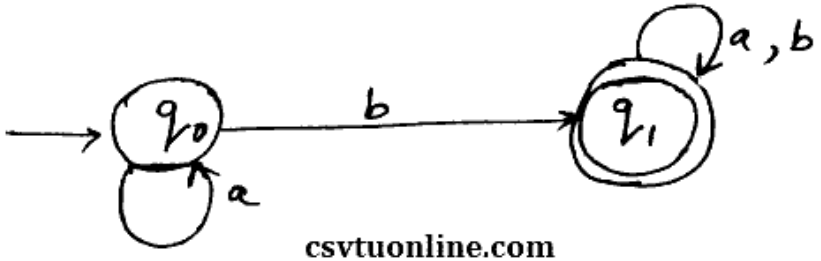

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fig.

3. (a) Define Context Free Grammar. 2

(b) Explain Ambiguity in CFG. 7

(c) Simplify the given CFG. 7

$S \rightarrow AB$,

$A \rightarrow a, B \rightarrow C / b$,

$C \rightarrow D, D \rightarrow E, E \rightarrow a$,

$F \rightarrow a$.

(d) Convert the given grammar $S \rightarrow aB / bA$.

$A \rightarrow aS / bAA / a$, $B \rightarrow bS / abBB / b$ into GNF 7

4. (a) How does a DPDA differ from NPDA? 2

(b) Design a TM to accept the language : 7

$$L = \left\{0^n 1^n / n \geq 1\right\}$$

(c) Explain Post Correspondence Problem. 7

(d) Design a PDA that accepts

$$\left\{w \subset w^R / w \text{ in } (0+1)^*\right\}$$

in by empty stack. 7

5. (a) Define Partial and Total Functions. 2

(b) Explain Recursive and Recursively Enumerable Sets. 7

(c) Explain Turing Model for Computation. 7

(d) What are Primitive Recursive Functions? Show that the function $f_1(x, y) = x + y$ is primitive recursive. 7

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