

**322514(22)**

APR-MAY

**B. E. (Fifth Semester) Examination, 2020**

**(Old Scheme)**

**(CSE Engg. Branch)**

**THEORY of COMPUTATION**

*Time Allowed : Three hours*

*Maximum Marks : 80*

*Minimum Pass Marks : 28*

*Note : Part (a) of each question is compulsory.*

*Attempt any two parts from (b), (c) and (d).*

**Unit-I**

1. (a) Explain Finite Automata. 2
- (b) Explain the difference between non deterministic finite automata and deterministic finite automata. 7

- (c) (i) Design a DFA which accept binary no. divisible by 5. 3.5
- (ii) Design a DFA which accept substring CAT or RAT over  $\Sigma = (A - Z)$ . 3.5
- (d) Minimize the following DFA by using my hill nerode theorem : 7

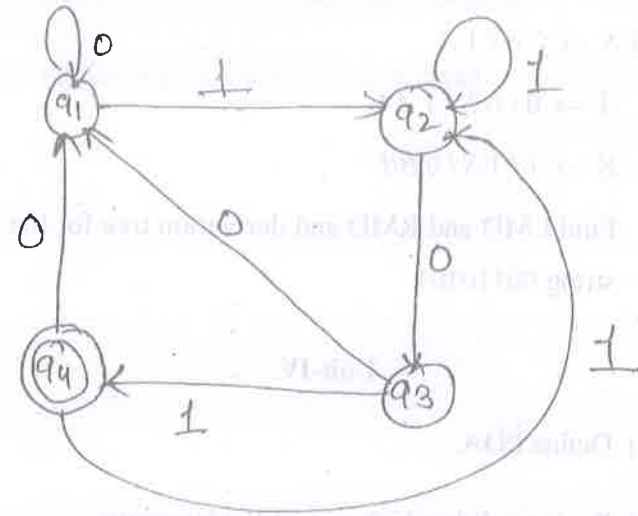
State / $\Sigma$	a	b
$\rightarrow q_0$	$q_1$	$q_4$
$q_1$	$q_2$	$q_3$
$q_2$	$q_7$	$q_8$
$q_3$	$q_8$	$q_7$
$q_4$	$q_5$	$q_6$
$q_5$	$q_7$	$q_8$
$q_6$	$q_7$	$q_8$
$q_7$	$q_7$	$q_7$
$q_8$	$q_8$	$q_8$

**Unit-II**

2. (a) Give regular expression for the set of string of a, b ending with string abb including null string. 2

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- (b) Convert the given Regular Expression into DFA : 7
- $RE = 10 + (0 + 11) 0^* 1$
- (c) Find the Regular Expression for the given transition system : 7



- (d) Prove that the following language is not Regular. 7

$$L = \{ 0^i 1^i / i \geq 1 \}$$

**Unit-III**

3. (a) Define Grammer. 2

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(b) Explain Chomsky classification of grammer. 7

(c) Convert into GNF : 7

$$E \rightarrow E + T / T$$

$$T \rightarrow T * F / F$$

$$F \rightarrow (E) / a$$

(d)  $S \rightarrow 0B / 1A$

$$A \rightarrow 0 / 0S / 1AA$$

$$B \rightarrow 1 / 1S / 0BB$$

Find LMD and RMD and derivation tree for the string 00110101. 7

#### Unit-IV

4. (a) Define PDA. 2

(b) Design a Pda which accept the language 7

$$L = \{ a^n b^{2n} / n \geq 1 \}$$

(c) Construct a PDA equivalent to following CFG.

$$S \rightarrow 0BB$$

$$B \rightarrow 0S / 1S / 0$$

And test whether 010<sup>4</sup> is in  $N(A)$ . 7

(d) Explain Halting problem of Turing Machine. 7

#### Unit-V

5. (a) Define Ackerman's function. 2

(b) Explain Turing Model for computation. 7

(c) Explain Recursive enumerable language and sets. 7

(d) Explain Recursive functions in detail. 7