

Seat  
No.

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CII1327

## Theory of Computer Science (New) (1020)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** questions from each unit.
5. Assume suitable data if necessary.
6. Figures to the right indicate full marks.

### UNIT - I

1. a) Construct a minimum state automaton equivalent to a given automation M whose transition table is given below.

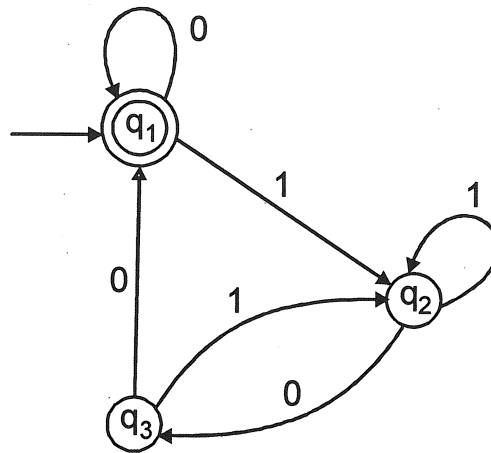
10

States	Inputs	
	0	1
a	b	a
b	a	c
c	d	b
ⓓ	d	a
e	d	f
f	g	e
g	f	g
h	g	d

- b) Design Melay Machine to find out 2's complement of a given binary number. 10
- c) Explain FSM Properties and Limitations. 10

## UNIT - II

2. a) Construct a regular expression corresponding to the state diagram. 10



- b) Show that  $L = \{WW / W \in \{a,b\}^*\}$  is not regular. 10
- c) Explain decision algorithms for regular sets. 10

## UNIT - III

3. a) Consider the following grammar G 10

$S \rightarrow AB$

$A \rightarrow a$

$B \rightarrow C/b$

$C \rightarrow D$

$D \rightarrow E$

$E \rightarrow a$

Remove the unit production.

- b) Find the reduced grammar that is equivalent to the CFG given below. 10

$S \rightarrow aC / SB$

$A \rightarrow bSCa$

$B \rightarrow aSB / bBC$

$C \rightarrow aBC / ad$

- c) Explain pumping Lemma for CFL's 10

**UNIT - IV**

4. a) Construct a PDA accepting.  
 $L = \{WCW^T / W \in \{a,b\}^*\}$  by final state. **10**
- b) Design Markov algorithm for reversing a given string over  $\Sigma = \{a, b, c, d\}$ . **10**
- c) Explain PMT systems with example. **10**

**UNIT - V**

5. a) Design a Turing Machine to divide two unary numbers giving quotient and remainder. **10**
- b) Design a Turing Machine to find out GCD of two given numbers. **10**
- c) Explain Halting problem of Turing Machine. **10**

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