

**B.TECH SEM – V (2007 COURSE) (COMPUTER ENGG.) : WINTER
- 2017**

SUBJECT: THEORY OF COMPUTATION

Day: **Saturday**
Date: **13/01/2018**

W-2017-2455

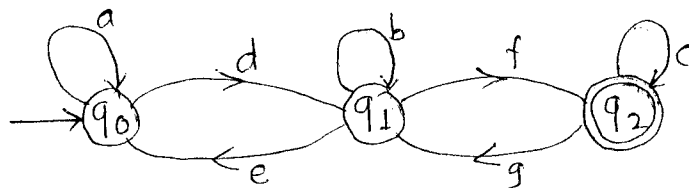
Time: **02.30 PM TO 05.30 PM**
Max Marks: **80**

N.B:

- 1) **Q. No 1 and Q. No. 5 are COMPULSORY.** Out of remaining questions Attempt **ANY TWO** questions from each section.
- 2) Answer to both the sections should be written in the **SEPARATE** answer book.
- 3) Draw neat and labeled diagram **WHEREVER** necessary.
- 4) Figures to the right indicate **FULL** marks.
- 5) Assume suitable data if necessary.

SECTION-I

- Q.1** a) Design a DFA for set of all strings over {a, b} containing neither aa nor bb as a substring. (05)
b) Find regular expression for the given three state machine shown in fig. (05)



- c) What is unit production? Explain with example. (04)
- Q.2** a) Design DFA that leftmost symbol differ from right most symbol $\Sigma \{0, 1\}$. (06)
b) Construct the minimum state DFA equivalent to given DFA. (07)

	0	1
$\rightarrow q_0$	q_1	q_4
q_1	q_2	q_5
* q_2	q_3	q_4
q_3	q_4	q_7
q_4	q_5	q_8
* q_5	q_6	q_1
q_6	q_7	q_1
q_7	q_8	q_2
* q_8	q_0	q_4

- Q.3** a) Check weather or not the following grammar is ambiguous; it is ambiguous, removes the ambiguity & writes an equivalent unambiguous grammar. (07)
 $S \rightarrow ictS / ictSeS/a$
 $C \rightarrow b$
- b) Eliminate ϵ production from G, where G consists of the following production. (06)
 $S \rightarrow a S a / b S b / \epsilon$.
- Q.4** a) Consider the Moore machine described by the transition table, construct the corresponding mealy machine. (07)

Current State	Next State		Output
	a=0	a=2	
q_1	q_1	q_2	0
q_2	q_1	q_3	0
q_3	q_1	q_3	1

- b) Construct DFA that accepts the language represented by $r = (ab/ba)^* aa(ab/ba)^*$ (06)

P.T.O

SECTION-II

- Q.5** a) Write difference between DPDA & NPDA. (05)
- b) Design TM that performs the addition of two unary numbers. (05)
- c) Write applications of grammar. (04)
- Q.6** a) Construct PDA that accepts the language generated by the following CFG. (07)
 $S \rightarrow SS / (S) / ()$
- b) Construct PDA for the language described as follows: (06)
The set of all strings over alphabet {a, b} with exactly equal number of a's & b, 's.
- Q.7** a) Construct turing machine for checking well formedness of parenthesis. (07)
- b) Design turing machine that replaces all occurrences of 111 by 101 from sequence of 0's & 1's. (06)
- Q.8** Write applications of turing machine & PDA. (07)
- Write short notes (06)
- i) Lexical Analyzer
 - ii) Text editor