Roll Number:_____

Thapar University, Patiala

Department of Computer Science and Engineering

B. E. (Third Year): Semester-II

Course Code: UCS701

(COE)

Course Name: Theory of Computations

March 17, 2016

Thursday, 1.00 – 3.00 PM

Time: 2 Hours, M. Marks: 30

Name Of Faculty: Shalini Batra

Note: All questions are compulsory. Make suitable assumptions, with reasoning, where ever required.

Q1.a) Give the Regular expression and DFA for the statement: (1+3)

"The set of all strings in which every pair of adjacent zeros appears before any pair of adjacent ones" $\Sigma = \{0,1\}$

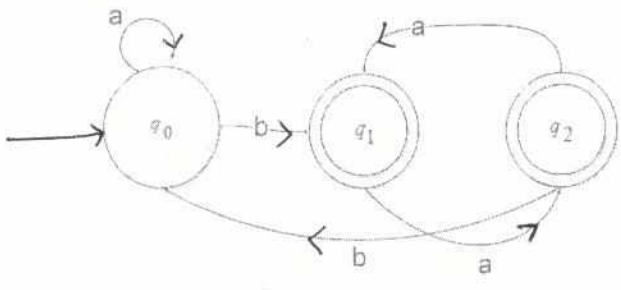
b) Convert the following NFA to DFA (3)

	Input	
State	0	1
→q0	q0,q1	q3
q1	q0	q1,q3
q2	Φ	q1,q2
* q3	q0, q1,q2	q1

Q2a) Consider the grammar given below. Obtain the leftmost and rightmost derivation for the string "011100" (3)

$$S \rightarrow 0S1S \mid 1S0S \mid \varepsilon$$

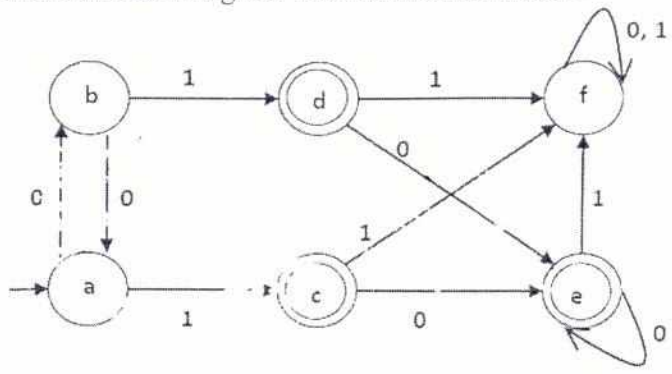
b) Give the regular expression for the following DFA



(3)

P.T.O

Q3a) Check whether the given DFA can be minimized:- (3)



b) For Σ= {a,b}, Let L1= {w | w has an even number of a's} and L2 = { w| w has one or two b's}. Find L1∩L2 (3)

Q4a) Convert the following grammar to Chomsky Normal Form: (3)

S→ ASA | aB A → B | S B →b | epsilon

b) Design a Mealy machine for computing the excusive-OR of the two previous symbols in the input. (For example given the input string 0011101010 , the output is 0010011111. (3)

Q5 a) Model a DFA such that it accepts all binary strings that begin with a 1, and are divisible by 5, reading right to left. i.e. 101 is an acceptable answer but 0101 is not. (3)

b) Give the Thompson's construction for a*(a/b/c)*. (2)