Roll No. ⬚⬚⬚⬚⬚⬚⬚

Paper Code: TCS501

B Tech CSE End Term Back Examination 2017
Fifth Semester
Theory of Computation

MM: 100

Time: Three Hours
Note:
(i) This question paper contains five questions.
(ii) All questions are compulsory.
(iii) Instructions on how to attempt a question are mentioned against it.
(iv) Total marks assigned to each question are twenty.

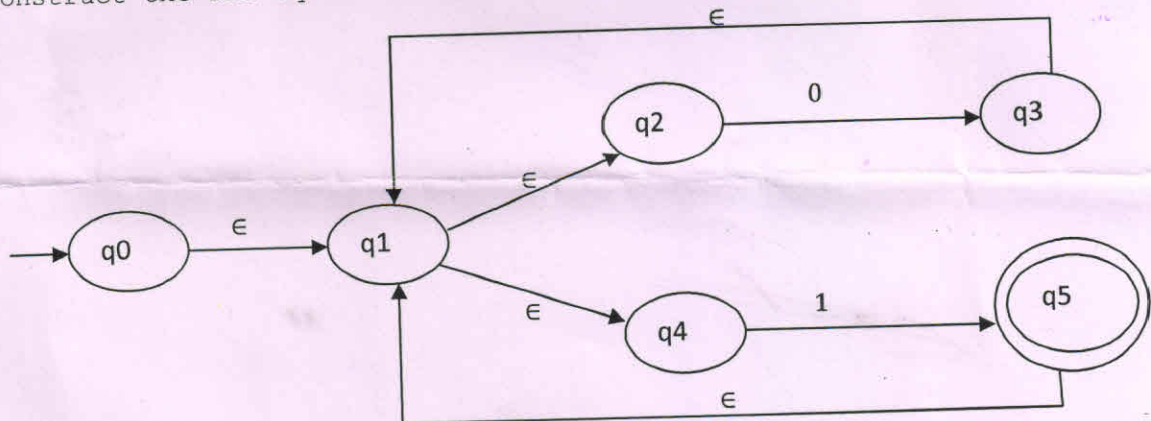Q1. (Attempt any two questions of choice from a, b and c)   (2X10=20 Marks)
a. What do you understand by set? Explain all the types of set operations.
b. What do you mean by graph? Explain all the types of graph.
c. What do you understand by Chomsky Classification of language? Explain with example.

Q2. (Attempt any two questions of choice from a, b and c)   (2X10=20 Marks)
a. What do you mean by Finite Automata? How many types of FA? Explain with suitable example.
b. Give the grammar to represent the language L(G) with words consisting of following language over Σ = {a, b}
      (i) At least one occurrence of aaa
      (ii) Palindromes of odd length
      (iii) Odd length of a
c. Explain the Moore machine. Design a Moore machine for 1's complement of binary numbers.

Q3. (Attempt any two questions of choice from a, b and c)   (2X10=20 Marks)
a. Explain the concept of pumping lemma for regular language. Prove that the language L= {$a^i b^i$: i>= 1} is not regular.
b. Construct the DFA equivalent to the following NFA

c. Construct the leftmost and rightmost derivation and parse tree for the following grammar:
      S→aB |bA,

A→aS |bAA |a,
B→bS |aBB |b which accept the string aaabbabbba

Q4. (Attempt any two questions of choice from a, b and c)   (2X10=20 Marks)
a. Design the PDA accepting $\{a^m b^m c^n \mid m,n >=1\}$ by empty store.
b. What is the use of Arden's Theorem? Prove that $R = QP^*$
c. Construct a PDA to accept the language $L= \{ww^R: w \in \{a, b\}^*\}$

Q5. (Attempt any two questions of choice from a, b and c)   (2X10=20 Marks)
a. What do you understand by CHURCH-TURING's thesis? Explain in brief.
b. Explain all the types of Turing machine.
c. Design a Turing Machine to accept a language $L= \{0^n 1^n \mid n >=1\}$