Code: CS3T4

II B.Tech - I Semester–Regular/Supplementary Examinations
November 2017

FORMAL LANGUAGES AND AUTOMATA THEORY
(COMPUTER SCIENCE & ENGINEERING)

Duration: 3 hours   Max. Marks: 70

PART – A

Answer *all* the questions.   All questions carry equal marks
                                                    11x 2 = 22 M

1.
   a) What is the difference between Moore and Mealy machine?
   b) What is the significance of ε- transitions in NFA?
   c) Write a Regular Expression for Language which consists of strings with atleast two a's over alphabet $\sum$={a,b}?
   d) What is the purpose of pumping lemma for regular sets?
   e) Explain ambiguity in context free grammar.
   f) What are the closure properties of CFL?
   g) Give the formal definition of Turing Machine.
   h) What is counter machine?
   i) Differentiate between Push Down Automata and Turing Machine.
   j) What is decidable problem? Give examples.
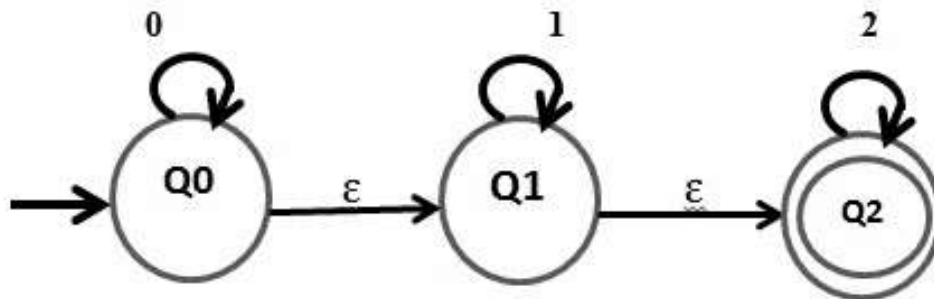   k) What is universal Turing Machine?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Explain about Chomsky hierarchy of languages. 7 M

   b) Write the procedure for converting NFA with ε to NFA without ε? Construct NFA without ε transitions for the following NFA with ε moves. 9 M

3. a) Construct Finite Automata for regular expression
   01*0+0(01+10)*(11)* 8 M

   b) Explain Left Linear and Right Linear grammars with examples. 8 M

4. a) Explain the equivalence of acceptance of Push Down Automata by final state and empty state. 8 M

b) Convert the following CFG into CNF   8 M

   S ->bA | aB
   A ->bAA | aS | a
   B ->aBB | bSbb

5. a) Design a Turing Machine for the language
  $L=\{ a^n b^n | n>=1 \}$ 8 M

 b) Explain different types of Turing Machines.   8 M

6. a) Explain Post's Correspondence problem with example.
                 8 M

 b) Explain about P and NP classes in detail.   8 M