R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year II Semester Examinations, June-2014
FORMAL LANGUAGES AND AUTOMATA THEORY
(Computer Science and Engineering)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
- - -

1.a)   Consider the following figure 1 FA and describe what are the string accepted by the below Formal Automata
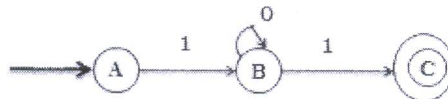

Figure: 1

  b)   Design DFA for the language over the alphabet {0, 1} in which the length of strings are divisible by either 3 or 4.

  c)   Let $L_1 = \{01, 110\}$, $L_2 = \{010, 10\}$ compute:
        i) $L_1 L_2$
        ii) L_1^*
        iii) L_2^*
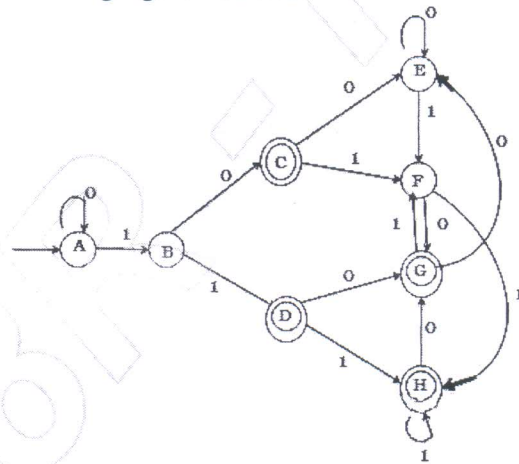   iv) $L_2 L_1$.

2.a)   Minimize the following figure 2a DFA

Figure: 2a

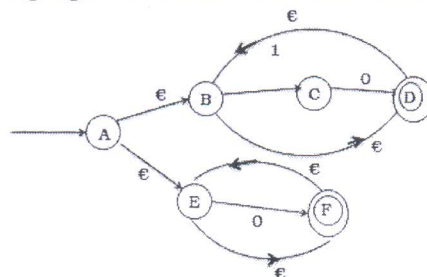 b)   Convert the following figure 2b NFA with Є-moves to DFA.

Figure: 2b

3.a) Write and explain all properties of regular sets.
  b) Convert the following figure 3 FA to Regular Expression

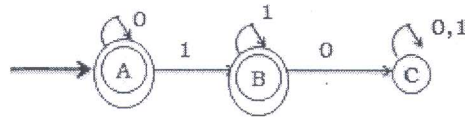

Figure: 3

4.a) Convert the following left linear grammar G = ({S},{0,1},P,S) where P is given by S→S10|1   to NFA with €-moves
  b) Find the right linear grammar and left linear grammar for the regular expression $(0+1)^*010(0+1)^*$.

5.a) Convert the following context free grammar G = ({E,T,F},{+,*,(,),id},P,E) to Chomsky Normal Form, where P is given as
E→E+T|T
T→T*F|F
F→(E)|id
  b) Define left recursion and left factoring. Give the equivalent grammars for removing left recursion and left factoring and apply on the following context free grammar
E→E+E|E*E|(E)|a

6.a) Design PDA for the language L={$a^n b^n c^m$ |n, m ≥ 1}
  b) Convert the following context free grammar to push down automata
S→aSbb|aab

7.a) Write briefly about the following:
i) Church Hypothesis
ii) Counter Machine.
  b) Design Turing Machine which performs proper subtraction of two numbers (Proper subtraction of m, n is defined as m-n, if m > n otherwise it is zero).

8.a) Write briefly about the following:
i) Chomsky Hierarchy of language
ii) Context Sensitive Grammar.
  b) Construct LR(0) items for the grammar G = ({A, B}, {a, b}, P, A) where P is given as
A→BB
B→aB|b.

---oo0oo---