# Formal Languages & Automation Theory
## (CS-404, Dec-2007)

**Note:** Section A is compulsory. Attempt any four questions from Section-B and any two from Section-C.

## Section-A

1. a) Name the operations that can be performed on a language.
   b) Differentiate between DFA and NFA.
   c) Can two Grammers of different type generate the same language? Prove.
   d) Find the Grammer accepting sets of all strings over {0, 1} consisting of equal number of 0's and 1's.
   e) Define the term Linear Grammer.
   f) What do you mean by one sided context sensitive Grammer?
   g) Differentiate between TM and Linear Bounded Automata.
   h) Differentiate between Moore and Mealy machine.
   i) Find the language generated by S→0S1/0A1, A→1A0/10.
   j) What is the advantage of Kuroda normal form?

## Section-B

2. Explain in brief the various types of languages. Also name the automata accepting those languages.
3. (a) Why do we need regular expressions?
   (b) Construct a regular expression for the given state diagram.
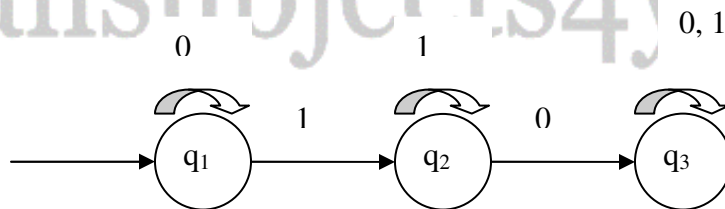


4. Explain in brief the properties of LL(k) grammers.
5. Show that the grammers S→a/abs b/aAb A→bs/aAAb is ambiguous.
6. Construct a pda (Push down automata) by empty store for
   $\{a^m b^n \ / \ m > n \geq 1\}$

## Section-C

7. (a) Reduce the following Grammer to Chomsky normal form
        S→ ABSB / A / AaB, A→ Bs / aAAb
   (b) Differentiate between context free and regular Grammer.
8. Design Turing machine that can accept the set of all palindromes over {0, 1}. Also verify its functioning using an example input.
9. Write short notes on any two:
   (a) Desivation languages
   (b) Cellular Automata
   (c) Syntax Analysis