

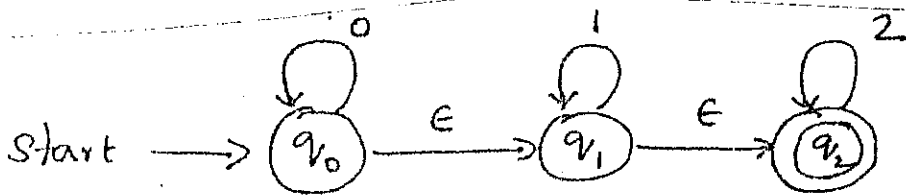
B.Tech. Degree V Semester Examination, November 2006

CS 504 AUTOMATA LANGUAGES AND COMPUTATION (Prior to 2002 Admissions)

Time: 3 Hours

Maximum Marks: 100

- I a) Construct the DFA accepting the following sets over $\{1, 0\}$
- (i) the set of all strings with an odd number of 0's
 - (ii) the set of all strings of 0's and 1's except those containing the sub string 001
- b) Prove that "Let L be a set accepted by a NFA. Then there exists a DFA that accepts L".
- OR**
- II a) Illustrate the concept of ϵ – closure with an example.
- b) Construct NFA without ϵ – moves equivalent to the NFA



- III a) Define Moore and Mealy machine. Show that Moore machine and mealy machine are equivalent.
- b) Discuss the applications of finite automata.
- OR**
- IV a) State and prove Myhill – Nerode theorem.
- b) Show that the set $\{a^n b^n ; n \geq 1\}$ is not regular using pumping lemma.
- V a) Define a Context Free Grammar. Give a CFG generating the set of palindrome over $\{a, b\}$
- b) Consider the grammar
- $$S \rightarrow aAbB$$
- $$A \rightarrow aA|a$$
- $$B \rightarrow bB|b$$
- Find an equivalent grammar in CNF.

OR

(Turn Over)

- VI a) Show that the language $L = \{a^i b^i c^i ; i \geq 1\}$ is not a context free language. (10)
 b) Construct the Push Down Automata for the given CFG.

$$S \rightarrow aAA$$

$$A \rightarrow aS | bS | a$$
 (10)
- VII a) With neat diagram explain the basic Turing Machine Model. (8)
 b) Design Turing Machine to accept the language, $L\{0^n 1^n | n \geq 1\}$. (12)
- OR**
- VIII a) Explain how a Turing machine can be used to check whether a number is prime. (8)
 b) Explain the following techniques for turing machine construction.
 (i) shifting over (ii) subroutines (12)
- IX a) Explain the Chomsky hierarchy. (10)
 b) Show that if L is a regular set then L is generated by some left linear grammar and by some right linear grammar. (10)
- OR**
- X a) State and prove hierarchy theorem of classes of languages. (10)
 b) Explain the term Linear Bounded Automation. What is the relationship between LBA and context sensitive languages? (10)
