B.Tech. Degree V Semester (Supplementary) Examination, June 2008

CS 504 AUTOMATA LANGUAGES AND COMPUTATION

(1999 Scheme)

Time: 3 Hours Maximum Marks: 100

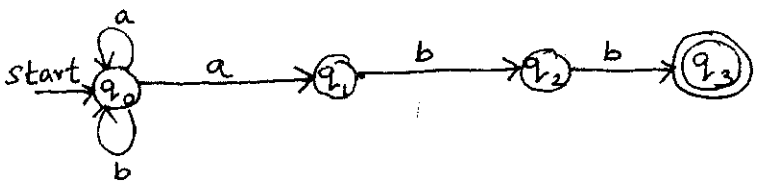
I a) Distinguish between NFA and DFA. Illustrate with an example. (10)

b) Prove the equivalence of NFA and DFA. (10)

OR

II a) Prove the equivalence of NFA with and without epsilon moves. (10)

b) Construct the DFA equivalent to the given NFA over $\{a,b\}$.



(10)

III a) State and prove Myhill-Nerode theorem. (15)

b) Explain the term Moore machine with an example. (5)

OR

IV a) Prove the equivalence of finite automata and regular expressions. (10)

b) Explain the following terms:

i) Regular Expressions

ii) Mealy Machines (5 x 2 = 10)

V Explain the following terms:

i) CHOMSKY Normal Form

ii) GREIBACH Normal Form

iii) PUSH DOWN AUTOMATA

iv) Derivation Tree (5 x 4 = 20)

OR

VI a) Design a deterministic PDA corresponding to language $L=\{wcw^R \mid w \text{ is in } (0+1)^*\}$ by empty stack. (10)

b) Explain useless symbol with an example. (10)

VII a) Explain the basic Turing Machine model with a neat diagram. (10)

b) Design a Turing Machine to accept the language $L=\{0^n1^n \mid n \geq 1\}$ (10)

OR

VIII Explain the following terms:

i) Storage in Finite control

ii) Non Deterministic Turing Machines

iii) Shifting Over

iv) Multiple tracks (5 x 4 = 20)

IX a) Show that if L has a regular grammar, then L is a regular set. (10)

b) Explain the following terms:

i) UNRESTRICTED GRAMMAR

ii) REGULAR GRAMMAR (5 x 2 = 10)

OR

X a) Show that if L is a regular set, then L is generated by some left-linear grammar and by some right –linear grammar. (10)

b) Explain the following terms:

i) Linear bound automata

ii) UNIVERSAL TURING MACHINE (5 x 2 = 10)

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