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Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2006

Computer Science

CS 104—THEORETICAL COMPUTER SCIENCE

(2005 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer any **five** *questions.*

1. Define with examples :
   (i) Deterministic automata.
   (ii) Regular expressions.
2. Describe pumping lemma for regular sets. What are the applications of pumping lemma ?
3. Define context free grammars with examples.
4. Define Turing machine. Also explain it as a computer of integer functions.
5. What are the properties of recursive and recursively enumerable languages.
6. Describe about the Chomsky hierarchy of languages.
7. Define countable and uncountable sets.

(5 x 8 = 40 marks)

Part B

Answer any **four** *questions.*

1. State Myhill-Nerode theorem. Explain how can we minimize a finite automata.
2. Describe about the space and time complexity of Turing machine with example.
3. L = $\{a^i b^i c^i I i$ 1$\}$. Using pumping lemma show that L is not a Context free language.
4. Describe with example :
   (i) Conjunctive normal form.
   (ii) Disjunctive normal form.
5. Define non-deterministic finite automata. Construct a NDFA which accepts strings with *either* two consecutive 0's *or* two consecutive l's.
6. State and prove Cooks theorem.

(4 X 10 = 40 marks)