

D 28053

Name.....

Reg.No

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2007

Computer Science

CS 104—THEORETICAL COMPUTER SCIENCE

(2005 Admissions)

Maximum : 80 Marks

Time : Three Hours

Section A

Answer any **five** questions.

1. Define **nondeterministic automata**. Is it possible to convert **NDA** into **DFA**? Give reasons.
2. Prove that the class of regular **sets** is closed under complementation.
3. Define ambiguous grammar.
4. Define **nondeterministic** Turing machine.
5. Prove that if L has a regular grammar then L is a **regular set**.
6. What is the use of derivation of trees in compilation of **programming languages**?
7. Describe about pushdown automata with example. (5 x 8 = 40 marks)

Section B

Answer any **four** questions.

1. Prove that context-free languages are closed under union, concatenation and **Kleene closure**. (Kleene's theorem)
2. Prove that any regular **language** can be accepted by a finite automation (Kleene's theorem part 1).
3. What is the **principle** of mathematical induction? Prove that $\sum_{i=1}^n i = \frac{n(n+1)}{2}$
4. Describe with example (i) **disjunctive normal form**. (ii) **principle disjunctive normal form**.
5. Describe (i) **Turning machines**. (ii) **Turning machine with multiple tape**.
6. Describe about context sensitive languages and context sensitive grammars. (4 x 10 = 40 marks)