



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION - COMPUTER SCIENCE

THIRD SEMESTER – NOVEMBER 2013

CS 3875 - THEORY OF COMPUTATION AND COMPILER DESIGN

Date : 15/11/2013
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

Section – A (10 X 2 = 20 Marks)

Answer all Questions

1. Define partial recursive function.
2. Construct a phrase structure grammar for the language $L(G) = \{a^n b^n c^n / n \geq 1\}$.
3. Define non-deterministic finite automaton.
4. State pumping lemma.
5. Define Turing machine.
6. What is compiler?
7. What is interpreter?
8. Define left factoring.
9. What is code optimization?
10. Draw the diagram of organization of the code optimizer

Section – B (5 X 8 = 40 Marks)

Answer all Questions

11.(a) Prove the following using venn diagrams

(i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (4)

(ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (4)

or

(b) Elaborately categorize the various types of grammar each with an example. (8)

12.(a) Construct a DFA accepting all strings over $\{0,1\}$ which ends with 01. (8)

or

(b) Using pumping lemma show that the language $L = \{a^m b^n\}$ is not regular. (8)

13.(a) Describe the structure of Turing machine. (8)

or

(b) Explain about the different phases of analysis in compiling

14.(a) construct a DFA for the expression $(a/b)^*abb$

or

(b) Explain in detail the stack implementation of shift reduce parsing

15 (a) What is optimization? Explain about Local optimization

or

(b) Write an algorithm for constructing the natural loop.

Section – C (2 X 20 = 40 Marks)

Answer any TWO Questions

16.(a) Elaborate Chomsky classification.

(10)

- (b) State and prove pumping lemma. (10)
- 17.(a) (i) What is a Turing machine? What is its significance? (5)
- (ii) Explain the universal Turing machine. (5)
- (b) Explain in detail about the phases of compiler (10)
- 18 (a) Construct the predictive parsing table for (10)
- $E \rightarrow TE'$, $E' \rightarrow +TE'/\epsilon$, $T \rightarrow FT'$, $T' \rightarrow *FT'/\epsilon$, $F \rightarrow (E)/id$
- (b) Explain in detail about DAG Representation (10)