MCA/D-16
COMPILER DESIGN
Paper : MCA-14-51
(Group-I)
Opt. (i)

Time Allowed: 3 Hours Maximum Marks: 80

Note: Attempt five questions in all. Question No. 1 is compulsory. All questions carry equal marks

1. (i) What is the difference between top-down and bottom-up parsing?
   (ii) What is predictive parsing? What are the conditions for it?
   (iii) What is the structure of symbol table?
   (iv) What is peephole optimization?

Unit-I

2. What is finite state automata? Construct the minimum state DFA for the following regular expressions : (a|b)*a(a|b)(a|b).

3. (a) Describe the language denoted by the following regular expressions; 0(0|1)*0
   (b) What do you understand by scanning? What types of grammars are used by scanner? Discuss.

Unit-II

4. What is syntax tree, postfix notation, and three address code? Translate the following arithmetic expression into a syntax tree, postfix notation, and three-address code: a*-(b+c)

5. (a) Differentiate between static scoping and dynamic scoping.
   (b) Which type of errors are caught by lexical analysis and syntax analysis.

Unit-III

6. What do you understand by recursive descent parsing? Given the following grammar, remove the left recursion, convert it into non-ambiguous grammar and write the procedure for every non-terminal for recursive descent parsing.
   E-E+E
   E-E*E E-id

7. What are bottom-up parsers? Explain the derivation and parse table of LALR and CLR parsers for any LR(k) grammar

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Unit-IV

8. (a) What is boolean expression? What is short circuit code? Write a note on intermediate code generation for Boolean expression.

   (b) What is Directed Acyclic Graph? Draw the DAG for the following code : a=b+c; e=a; f=a/d; h=f+i;

9. What do you understand by local and global code optimization? Discuss the following code optimizing transformations using suitable examples:

   (a) Frequency reduction
   (b) Strength reduction