

Roll No. ....

Total Pages : 03

**CMCSQ/D-23**

**24045**

COMPILER DESIGN

MS-20-33(i)

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all. Question Number **1** is compulsory. In addition to compulsory question, attempt *four* more questions, selecting *one* question from each Unit. All questions carry equal marks.

**(Compulsory Question)**

1. Answer any *five* of the following questions in brief :
  - (i) What is the difference between single-pass and multi-pass compilers ?
  - (ii) What does the regular expression  $(b \mid ab^*ab^*)^*$  mean ?
  - (iii) What are parse trees ?
  - (iv) What approach of parsing is adopted by bottom-up parsing techniques ?
  - (v) What do you mean by run time storage ?
  - (vi) List any *two* issues that arise during the code generation phase.

### **Unit I**

2. What is the significance of the term 'phase' in a compiler ? Describe the structure of a compiler in terms of its various phases and describe the purpose of each phase.
3. (a) What is the role of grammars in compiler construction ? How is context-free grammar defined ? Give example of a context-free grammar.  
(b) What is the relationship between lexical analyzer, regular expressions and finite automata ? Describe the importance and give a brief description of each.

### **Unit II**

4. How is parsing carried out using top-down approach ? What are the various types of top-down parsing schemes ? Explain using suitable examples.
5. Illustrate Shift-Reduce parsing using a suitable example. Also distinguish between Recursive-Descent Parser and Operator Precedence parser.

### **Unit III**

6. Why is a symbol table used in compiler design ? Which data structures are most appropriate to create symbol tables and why ?
7. What can be the sources of errors in a program ? Illustrate using examples, the kind of syntactic errors and lexical-phase errors.

### **Unit IV**

8. Describe the reason for the need of an intermediate code. What are the different ways in which intermediate code can be represented and what are their benefits ?
9. Give a brief overview of the following in the context of optimization :
  - (a) Basic blocks and flow graphs
  - (b) Local and loop optimization.