

BT-6/M-23

46165

COMPILER DESIGN

Paper-PC-CS-302A

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt any *five* questions, selecting at least *one* question from each unit.

### UNIT-I

1. (a) What is Regular Expression ? Write an algorithm to convert regular expression into NFA. 9
- (b) Draw NFA for the Regular Expression  $a(a + b)^*ab$ .
- (c) Draw NFA for  $a + b + ab$ .
- (d) Draw NFA corresponding to  $(0 + 1)^*1(0 + 1)$ . (2+2+2)
2. What are different phases of compiler and explain the role of different phases. 15

### UNIT-II

3. (a) What is parsing? Explain top, down and bottom up parsing with the help of example. 9
- (b)  $E \rightarrow T$
- $T \rightarrow T * F$
- $T \rightarrow id$
- $F \rightarrow T$
- $F \rightarrow id$

Draw parse tree representation of above expression for  $id * id$ .

6

4. What is LALR(1) parsing? Draw DFA and parsing table for the following equation :

$S \rightarrow AA$

$A \rightarrow aA$

$A \rightarrow b.$

15

### UNIT-III

5. (a) What is heap allocation and stack allocation? Prove it by taking an appropriate example. 10

- (b) What are different issues in designing of code generator? 5

6. What is DAG and write its algorithm? For the following statements :

1.  $S1 := 4 * i$

2.  $S2 := a[S1]$

3.  $S3 := 4 * i$

4.  $S4 := b[S3]$

5.  $S5 := S2 * S4$

6.  $S6 := prod * S5$

7.  $S7 := i + 1$

$i := S7$

if  $i \leq 20$  goto 1

15

## UNIT-IV

7. What are different source of optimization ? Explain the following optimization in detail with example :
- (a) Machine independent optimization.
  - (b) Loop optimization.
  - (c) Peephole optimization. 15
8. What is Global data flow analysis ? Explain Storage organization, static storage management and heap storage management with the help of example. 15
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