B.E. INFORMATION TECHNOLOGY EIGHTH SEMESTER

IT801 - COMPILER DESIGN

P. Pages : 2 **GUG/W/18/2047**

Time : Three Hours * 1 5 6 4 * Max. Marks : 80

Notes : 1. Same Answer book must be used for all questions.
2. All questions carry marks as indicated.
3. Due credit will be given to neatness and adequate dimensions.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Explain the concept of bootstrapping with suitable example. Also give the advantages of compiler. **8**

b) Describe the following expression after each phases. Explain how various phases could be combined as pass in a compiler. **8**
$a := b * c - d$.

OR

2. a) Explain in detail compiler construction tool **8**

b) Explain in brief language processing system. **8**

3. a) Write the rule to eliminate left recursion in a grammar prepare and eliminate the left recursion for the grammar:- **8**
$S \rightarrow Aa/b$
$A \rightarrow Ac/Sd/E$

b) Construct LALR parsing table for the following grammar:- **8**
$S \rightarrow CC$
$C \rightarrow CC/d$

OR

4. a) What is recursive descent parser? Construct recursive descent parser of the following grammar. **8**
$E \rightarrow E + T/T$
$T \rightarrow TF/F$
$F \rightarrow f/a/b$

b) Consider the following grammar $S \rightarrow As/b$ $A \rightarrow SA/a$. Construct the SLR parse table for the grammar. Show the actions of the parser for the input string "abab". **8**

5. a) Write annotated parse tree for expression $5+4*3n$ where grammar is:- **8**

$L \rightarrow En$

$E \rightarrow E+T/F$

$T \rightarrow t*F/F$

$f \rightarrow (E)/digit$

b) Discuss S-attributes and L-attributes with respect to SDD (Syntax Directed Definition). **8**

OR

6. a) Write short note on:- **8**

i) Static Allocation ii) Dynamic Allocation

b) Explain various approaches to symbol table organization. Explain each in detail. **8**

7. a) Translate the expressions into: **8**

i) Syntax tree ii) Prefix notation

Expressions:-

a) $a+b+c+d+e+f$

b) $a+b+c+d+a+f$

b) Generate three address code for the following statements:- **8**

$c[a[I, j]]=b[I, j]+c[a[I, j]+d[I, j]]$

where,

a & b are arrays of size $30*40$ and c & d are array of size 20.

OR

8. Translate the expression into quadruples, triple, indirect triple. **8+8**

i) $-(a+b)*(c+a)*(a+b+c)$ **=16**

ii) $A=b*-c+b*-c$.

9. a) Name the techniques used in Loop Optimization. Explain each in brief. **8**

b) Define the term data flow analysis? Define the term live variable. **8**

OR

10. Generate the code for the following statements for the target machine. **16**

[Target m/c is a byte addressable m/c with four bytes to a word and N general purpose registers). Assume all variables are static. Assume 3 registers are available.

$X=a[i]+1$

$A[i]=b[C[i]]$

$A[i][j]=b[i][k]*C[k][i]$

$A[i]=a[i]+b[i]$

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