

B.E. Information Technology Sem-VIII  
**IT801 : Compiler Design**

P. Pages : 2

Time : Three Hours



**GUG/S/19/2047**

Max. Marks : 80

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- Notes :
1. All questions carry marks as indicated.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Describe how various phases could be combine as a pass in a compiler. 8
- b) Explain the advantages of Analysis synthesis model of compilation. 8

**OR**

2. a) Explain different compiler construction tools. 8
- b) Explain the role of lexical analyzer. Also explain why lexical analyzer called scanner. 8
3. a) Construct the parsing table for the following grammar. 10  
 $E \rightarrow E + T / T$   
 $T \rightarrow T * F / F$   
 $F \rightarrow (E) / id$   
Also show the moves made by these LL(1) parser an input  $id + id * id$ .
- b) Write the rule to eliminate left recursion in a grammar. Eliminate the left recursion for the grammar. 6  
 $S \rightarrow aABe$   
 $A \rightarrow A bc / b$   
 $B \rightarrow d$

**OR**

4. a) Consider the following grammar 8  
 $S \rightarrow cc$   
 $C \rightarrow ec$   
 $C \rightarrow d$   
construct the SLR parsing table for this grammar.
- b) How CLR parsing table can be implemented. 8
5. a) Write in detail notes on type conversion using synthesized attributed (S-attributed) definition with example. 8

- b) Check whether the given SDD is L-attributed or not. 8  
 $D \rightarrow TL$   
 $T \rightarrow \text{int}$   
 $T \rightarrow \text{real}$   
 $L \rightarrow L, \text{id}$   
 $L \rightarrow \text{id}$

**OR**

6. a) Give the translation scheme for constructing syntax trees of the following grammar. Also generate the annotated parse tree for input string  $a-4+c$ . 8
- b) What are different storage allocation strategies. 8
7. a) Give translation scheme & generate the three address code for the following program 10  
while  
(A < c and B < D) do  
if A == 1 the C = C + 1  
else  
while A ≤ D de A = A + 2 .
- b) Translate the expression into quadruples, triple, indirect triple for the following expression. 6  
 $-(a+b)*(c+d)-(a+b+c)$ .

**OR**

8. a) Generate the three address code for the following statement. 8  
 $A[I, J] = B[I+J]$   
A is 2D array with dimension  $10 \times 20$   
B is 1D array with dimension 10 bpw = 1 byte
- b) Write short note on peephole optimization. 8
9. a) Explain how global common sub expression can be eliminated. 8
- b) What is leader statement? Write the steps or algorithm for partition a sequence of three-address statement into basic block. 8

**OR**

10. Consider the expression 16  
 $X = (a+b) - (e - (c+d))$
- a) Draw the DAG of the above expression.  
b) Order the nodes of the DAG using heuristic ordering.  
c) Label the nodes of the DAG using Labelling algorithm.  
d) Generate three address code by traversing the labelled tree.

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