USN | | | | | | | | | | **06IS662**

Sixth Semester B.E. Degree Examination, June/July 2015
Complier Design

Time: 3 hrs.   Max. Marks:100

**Note: *Answer FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1 a. Explain the phases of compiler with an example for the translation process. **(10 Marks)**
  b. Consturct a Transition diagram for the following
        i) Relational operators   ii) Identifier   **(06 Marks)**
  c. Explain Input Buffering with sentinels.   **(04 Marks)**

2 a. Define ambiguity? Prove that the following grammar is ambiguous or not with the string
    aa+a*
    $S \rightarrow SS+ \mid SS* \mid a$ **(06 Marks)**
  b. Given the grammar
        $E \rightarrow T + E \mid T$

        $T \rightarrow T * F \mid F$

        $F \rightarrow (E) \mid id$
    i) Make the necessary changes to make it suitable for LL(1) parsing.
    ii) For the resulting grammar, Construct FIRST and FOLLOW sets and LL(1) parsing table.
                                                                     (14 Marks)

3 a. Show that the following grammar
        $S \rightarrow SA \mid A$

        $A \rightarrow a$
    is SLR but not LL (1)   **(10 Marks)**
  b. Briefly explain handle pruning with an example.   **(05 Marks)**
  c. Give the shift reduce configuration for the string aaa * a + + over the grammar
    $S \rightarrow SS+ \mid SS* \mid a$ **(05 Marks)**

4   Consider the grammar
        $S \rightarrow CC$

        $C \rightarrow cC \mid d$
  a. Construct the canonical LR parsing table with LR (1) set of items. **(14 Marks)**
  b. Construct LALR parsing table.   **(06 Marks)**

PART – B

5 a. Give the SDD for the following grammar.
        $E \rightarrow E + T \mid T$

        $T \rightarrow T * F \mid F$ **(08 Marks)**

        $F \rightarrow (E) \mid digit$

b. Give annotated parse tree for the expression
   (3 + 4) * (5 + 6)n (06 Marks)
   Using SDD in Question 5 (a)

c. Briefly explain S → atrribute and L - attribute SDD. (06 Marks)

6 a. Construct the DAG for the expression
   a + a * (b − c) + (b − c) * d (04 Marks)

b. Translate the arithmetic expression
   a = b + −(c + d) into
   i)   Syntax Tree
   ii) Quadruple
   iii) Triples
   iv) Indirect Triples (12 Marks)

c. Explain Type checking with the help of a suitable example. (04 Marks)

7 a. Explain the design goals for Garbage collection. (10 Marks)

b. Write short notes on :
   i) Activation records
   ii) Heap Mangagement (10 Marks)

8 a. Translate the following program into 3-address statement and construct Flow graph with
   clear identification of loops :

   for i from 1 to 10 do

       for j from 1 to 10 do

           a[i, j] = 0.0;

       for i from 1 to 10 do

           a[i, i] = 1.0;

   (15 Marks)

b. Define DAG. Construct DAG for the following basic block

   a = b + c;

   b = b − d

   c = c + d

   e = b + c

   (05 Marks)

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