USN | | | | | | | | | | | **10IS662**

Sixth Semester B.E. Degree Examination, June/July 2019
Compiler Design

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a.   Explain compiler construction tools.   **(06 Marks)**
    b.   Discuss three types of software productivity tools.   **(06 Marks)**
    c.   Construct the transition diagram to recognize the tokens given below:
         i)   Relational operator
         ii)   Identifier
         iii) Unsigned number.   **(08 Marks)**

2   a.   What is recursive descent parser? Consider the grammar
         $S \rightarrow c \times d$
         $X \rightarrow ab \mid a$
         Parse the string "cad" using recursive descent parser.   **(04 Marks)**
    b.   Remove left recursion from the grammar given below
         $S \rightarrow (M) \mid a$
         $M \rightarrow M \ ; S \mid S$ **(04 Marks)**
    c.   Construct predictive parsing table for the following grammar:
         $P \rightarrow Ra \mid Qba$
         $R \rightarrow aba \mid caba \mid Rbc$
         $Q \rightarrow bbc \mid bc$ **(09 Marks)**
    d.   Write an algorithm for constructing predictive parsing table.   **(03 Marks)**

3   a.   What is the meaning 'L' and 'R' in LR grammar? Why LR parsing is attractive?   **(04 Marks)**
    b.   Construct $L_R(0)$ items for the following grammar
         $E \rightarrow E + T \mid T$
         $T \rightarrow TF \mid F$
         $F \rightarrow F * \mid a \mid b$ **(08 Marks)**
    c.   What is meant by handle pruning? Consider the following grammar.
         $S \rightarrow TL;$
         $T \rightarrow int \mid float$
         $L \rightarrow L, id \mid id$
         Parse the input string int id, id ; using shift reduce parser.   **(08 Marks)**

4   a.   Construct canonical LR(1) items for the grammar
         $S \rightarrow (L) \mid a$
         $L \rightarrow L, s \mid s$ **(10 Marks)**
    b.   How LALR parsing table is constructed? Develop an algorithm for the same. **(10 Marks)**

PART – B

5 a. Write semantic rules and annotated parse tree to compute 5 ∗ 6, using a grammar suitable for top down parsing. **(07 Marks)**

b. Give syntax directed definition for simple type declaration. **(04 Marks)**

c. Write SDD for while statement. **(05 Marks)**

d. Define inherited and synthesized attribute. **(04 Marks)**

6 a. Describe syntax directed definition for flow of control statements. **(10 Marks)**

b. Obtain DAG for the expression a + a ∗ (b – c) + (b – c) ∗ d. Also give the sequence of steps for constructing the same. **(06 Marks)**

c. Write a note on Quad ruples and Triples. **(04 Marks)**

7 a. Write intermediate code for the following a = f (b[i]). **(04 Marks)**

b. Explain in detail, the strategy for reducing fragmentation in heap memory. **(08 Marks)**

c. Discuss the performance metrics to be considered while designing a garbage collector. **(08 Marks)**

8 a. With an example, explain common subexpression and dead code elimination methods. **(10 Marks)**

b. Consider the following program segment
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
write the three-address code and construct the basic blocks. **(06 Marks)**

c. Write machine code, equivalent for the following "If x < y goto L". **(04 Marks)**

* * * * *