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Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Compiler Design

Time: 3 hrs.

Max. Marks:100

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

PART – A

1.
 - a. Explain language processing system, with diagram. (05 Marks)
 - b. Explain token, Lexeme and pattern with example. (05 Marks)
 - c. Give transition diagram for relational operator. (05 Marks)
 - d. Write regular expression for unsigned number. (05 Marks)

2.
 - a. What is left recursion? Eliminate left recursion from the following grammar :
 $A \rightarrow ABd|Aa|a$
 $B \rightarrow Be|b$ (05 Marks)
 - b. What is left factoring? What is its advantage? (05 Marks)
 - c. Explain the rules/steps to calculate FIRST and FOLLOW. (06 Marks)
 - d. Explain error recovery stages in syntax analysis. (04 Marks)

3.
 - a. Construct the predictive parsing table for the grammar :
 $S \rightarrow A$
 $A \rightarrow aB|Ad$
 $B \rightarrow bBC|f$
 $C \rightarrow g$
 If it necessary to calculate FOLLOW? (06 Marks)
 - b. Whether the given grammar is LL(1) or not? Construct predictive parsing table for same.
 $S \rightarrow AaAb|BbBa$
 $A \rightarrow \epsilon$
 $B \rightarrow \epsilon$
 Trace the grammar for string "ba". (10 Marks)
 - c. What is handle pruning? Explain. (04 Marks)

4.
 - a. Give the grammar $A \rightarrow (A)|a$
 Find : i) LR(0) items
 ii) Construct SLR(1) parsing table
 iii) Show parsing steps for string ((a)). (08 Marks)
 - b. Show that, the following grammar is LR(1) but not LALR.
 $S \rightarrow Aa|bAC|BC|bBa$
 $A \rightarrow d$
 $B \rightarrow d$. (12 Marks)

PART – B

- 5 a. For the CFG given below, obtain SDD construct parse tree, syntax tree and annotated parse tree for input $5 * 6 + 7$.
- $S \rightarrow EN$
 $E \rightarrow E + T \mid E - T \mid T$
 $T \rightarrow T * F \mid T / F \mid F$
 $F \rightarrow (E) \mid \text{digit}$
 $N \rightarrow ;$
- (09 Marks)
- b. Construct DAG for $((a * b) + (c - d) * (a * b)) + b$. (06 Marks)
- c. Construct the translation scheme to enter type of each identifier using following grammar and apply it for string "id, id, id : real". (05 Marks)
- 6 a. What is quadruple? Triple and indirect triple? Translate the arithmetic expression : $a + - (b + c)$ into quadruple, triple and indirect triple. (06 Marks)
- b. Generate three address code for following code segment.
- ```

c = 0
do
{
 if (a < b)
 x++;
 else
 x --;
 c++
} while (c < 5)

```
- (04 Marks)
- c. What are the benefits of intermediate code generation? Write properties of intermediate languages. (06 Marks)
- d. What do you mean by short-circuit code? Explain with an example. (04 Marks)
- 7 a. What is activation record? Explain fields of general activation record. (08 Marks)
- b. Explain design goals of garbage collectors. (06 Marks)
- c. How reference counts of garbage collectors can be minimized? (06 Marks)
- 8 a. Explain issues of design of code generator. (10 Marks)
- b. Discuss the methods of optimization of basic blocks. (10 Marks)

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