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Sixth Semester B.E. Degree Examination, June / July 2014
Compiler 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 various phases of a compiler with the help of neat diagram. (08 Marks)
 b. Give the formal definitions of operations on languages with notations. (04 Marks)
 c. Write the transition diagram to recognize the token below:
 i) relop (relational operations) (08 Marks)
 ii) unsigned number. (08 Marks)
- 2 a. Give the rules for constructing FIRST and FOLLOW sets. (06 Marks)
 b. Construct the predictive parsing table by making necessary changes to the grammar given below:
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$ (10 Marks)
 c. Give the formal definition of CFG with an example. (04 Marks)
- 3 a. What is a shift-reduce parser? Explain the conflicts that may occur during shift-reduce parsing. List the actions of shift-reduce parser. (06 Marks)
 b. Form the Action / Goto table for the following grammar:
 $S \rightarrow Aa \mid bAc \mid Ba \mid bBa$
 $A \rightarrow d$
 $B \rightarrow d$
 Justify whether the grammar is LR(0) or not. (14 Marks)
- 4 a. Construct the canonical LR(1) Item sets for the following grammar:
 $S \rightarrow AA$
 $A \rightarrow aA \mid b$ (10 Marks)
 b. Construct LALR parsing table for the grammar shown in Q4 (a) using LR(1) items. (10 Marks)

PART – B

- 5 a. Define inherited and synthesized attributes. Give examples. (06 Marks)
 b. Give the SDD for simple desk calculator and draw dependency graph for expression, $1 * 2 * 3 * (4 + 5)n$ (10 Marks)
 c. Write SDD that generates either a basic type or an array type. (04 Marks)
- 6 a. Draw the DAG for the expression, $a + a * (b - c) + (b - c) * d$. Show the steps for constructing the same. (10 Marks)
 b. Explain the following with examples: i) Quadraples ii) Triples. (06 Marks)
 c. Write the three address code for the expression:
 $a + a * (b - c) + (b - c) * d$ (04 Marks)

- 7 a. Give the general structure of an activation record. Explain the purpose of each component. (08 Marks)
- b. Explain the performance metrics that must be considered while designing garbage collector. (08 Marks)
- c. Give the memory hierarchy configurations of modern computer highlighting size and access times. (04 Marks)
- 8 a. Explain the main issues in code generation. (10 Marks)
- b. For the following program segment:
- ```
for i = 1 to 10 do
 for j = 1 to 10 do
 a[i, j] = 0.0
 for i = 1 to 10 do
 a[i, i] = 1.0
```
- Generate intermediate code and identify basic blocks. (10 Marks)

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