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06CS63

Sixth Semester B.E. Degree Examination, Dec.09/Jan.10
Compiler Design

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain a language processing system, with a block diagram. **(08 Marks)**

b. Explain the concept of input buffering in the lexical analysis. **(06 Marks)**

c. Write the transition diagram to recognize the token relop. (Corresponding to relational operators in a language). **(06 Marks)**

2 a. What is left-recursion? Eliminate left recursion from the following grammar:
$E \rightarrow E + T / T$; $T \rightarrow T * F / F$; $F \rightarrow (E) / id$ **(06 Marks)**

b. Obtain the predictive parsing table for the following grammar:
$S \rightarrow iEtSS' / a$; $S' \rightarrow eS / \in$; $E \rightarrow b$ **(14 Marks)**

3 a. Obtain LR(O) items for the following grammar:
$S \rightarrow L = R / R$; $L \rightarrow *R / id$; $R \rightarrow L$ **(08 Marks)**

b. Obtain first and follow symbols for the grammar shown in Q3 (a) and obtain SLR parsing table. Is the grammar SLR? **(12 Marks)**

4 a. Given the following grammar:
$S \rightarrow CC$; $C \rightarrow cC / d$
i) Construct sets of LR(1) items.
ii) Construct canonical LR(1) parsing table. **(12 Marks)**

b. Construct LALR parsing tables for the grammar shown in Q4 (a) using LR(1) items. **(08 Marks)**

PART – B

5 a. Explain the concept of syntax directed translation, with examples. **(06 Marks)**

b. Define inherited and synthesized attributes. **(04 Marks)**

c. Give SDD of a simple desk calculator. **(04 Marks)**

d. Write the annotated parse tree for $3 * 5 + 4n$. **(06 Marks)**

6 a. Draw the DAG for the arithmetic expression, $a + a * (b - c) + (b - c) * d$. Show the steps for constructing the DAG. **(10 Marks)**

b. What are three address codes? Explain different ways of representing three address codes, with examples. **(10 Marks)**

7 a. What is an activation record? Explain the purpose of each item in the activation record, with example. **(08 Marks)**

b. Distinguish between static scope and dynamic scope. **(04 Marks)**

c. What do you mean by calling sequence? Explain the actions performed during, i) function call ii) return. **(08 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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Important Note: 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. 2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8=50, will be treated as malpractice.