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7E4239

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B. Tech. (Sem. VII) (Main/Back) Examination, December-2012
Computer Engg.
7CS3 Compiler Construction

Time : 3 Hours] [Maximum Marks : 80
[Min. Passing Marks : 24

Attempt overall Five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. And data you feel missing suitably be assumed and stated clearly.
Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) What do you understand by "Input Buffering" ? Explain 'Buffer pairs' and sentinels also ?

8

(b) What is a finite automata ? Explain NFA and DFA with an example ? Construct NFA, that recognizes $(a/b)^*$ abb. Also show that whether the string $aabb$ is accepted by this NFA or Not.

2+4+2

OR

1 (a) Explain all phases of compiler with suitable example.

8

(b) What are the main functions performed by Lexical analyzer ?

4

(c) Differentiate between compliler and interpreter.

4

UNIT - II

2 (a) What do you mean by LR parser ? What is the model of an LR parser ? Explain. 4

(b) Consider the augmented expression grammar givne below-

$E' \rightarrow E$

$E \rightarrow E+T/T$

$T \rightarrow T*F/F$

$F \rightarrow (E)/id$

If I is the set of two items $[E' \rightarrow E.]$ and $[E \rightarrow E.+T]$, then calcualte - goto $(I,+)$ 4

(c) Explain the model of predictive parser. 4

OR

2 (a) Calculate Canonical collection of sets of LR(0) items of grammar given below -

$E' \rightarrow E$

$E \rightarrow E+T/T$

$T \rightarrow T*F/F$

$F \rightarrow (E)/id$ 8

(b) Calculate Canonical collection of sets of LR(1) items for the grammar given below -

$S' \rightarrow S$

$S \rightarrow CC$

$C \rightarrow c\,C/d$ 8

UNIT - III

3 (a) Define L-attributed definition. Explain the specification of a simple type checker with example. 8

(b) Write short notes on : (any two)
(i) Types of three address statements
(ii) Intermediate code generation
(iii) Synthesized attribute. 4+4

OR

3 (a) Define Syntax Directed Definitions ? Define the expressions used by type checker. 8

(b) For the assignment statement $X=(a+b)*(c+d)$, construct the translation scheme and an annotated parse tree. 8

UNIT - IV

4 (a) Explain the various storage allocation strategies ? 8

(b) Write short notes on :
(i) Dangling references
(ii) Activation record 8

OR

4 (a) Explain the organisation of symbol table in detail. Also explain the various data structures used in symbol tables. 8

(b) Differentiate between 'Call by value' and 'Call by Reference' with examples. 8

UNIT - V

5 (a) Define Basic Blocks and flow graphs ? Explain structure preserving transformation on basic blocks in detail. 4+8

(b) What do you understand by code optimization ? 4

OR

5 (a) What do you mean by DAG ? Write an algorithm for constructing a DAG. **4**

(b) Consider the following Basic Block, and then construct the DAG for it.

$t_1 = a + b$

$t_2 = c + d$

$t_3 = e - t_2$

$t_4 = t_1 - t_3$ **4**

(b) Explain peephole optimization ? **8**
