(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 110603 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VI) THEORY EXAMINATION 2013-14

COMPILER DESIGN

Time : 3 Hours *Total Marks : 100*

Note :– (1) Attempt **all** questions. Each question carries equal marks.

(2) Be precise and to the point while answering.

1. Attempt any **four** parts : **(5×4=20)**

(a) Describe the synthesis-analysis model of compiler.

(b) What are different compiler tools ? Discuss any two.

(c) Remove left recursion from the grammar

$E \rightarrow E\ (T) \mid T$

$T \rightarrow T\ (F) \mid F$

$F \rightarrow id$

(d) What do you mean by ambiguous grammar ? Show that the following grammar is ambiguous.

$S \rightarrow a\ S\ b\ S \mid b\ S\ a\ S \mid \in$

(e) Define boot–strapping with the help of an example.

(f) Explain the term token, lexeme and Pattern.

2. Attempt any **two** parts : **(10×2=20)**

(a) What do you mean by operator precedence grammar ?

Compute the operator precedence table for the given grammar.

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

(b) Differentiate between Recursive Decent Parsing and Predictive Parsing. Derive the LL (1) parsing table for the following grammar

bexpr → bexpr or bterm | bterm

bterm → bterm and bfactor | bfactor

bfactor → not bfactor | (bexpr) | true | false

(c) Show that the following grammar

$S \rightarrow Aa \mid bAc \mid Bc \mid bBa$

$A \rightarrow d$

$B \rightarrow d$

is L R (1) but not LALR (1).

3. **Attempt any two parts :** **(10×2=20)**

(a) Define Syntax Directed Translation. Construct an annonated parse tree for the expression (4 * 7 + 1) * 2, using the simple desk calculator grammar.

(b) What are different ways to write three address code ? Write the three address code for the following code segment :

While A < C and B < D do

if A = 1 then C = C +1

else while A < = D do A = A + 2.

(c) Define backpatching and semantic rules for boolean expression. Derive the three address code for the following expression

$P < Q$ and $R < S$ and $T < U$

4. Attempt any **two** parts : **(10×2=20)**

(a) What is the role of symbol table ? Discuss different data structures used for symbol table.

(b) What are lexical phase errors, syntactic phase errors and semantic phase errors ? Explain with suitable example.

(c) Why run-time storage management is required ? How simple stack implementation is implemented ?

5. Attempt any **two** parts : **(10×2=20)**

(a) What is DAG ? How DAG is created from three address code ? Write algorithm for it and explain it with a relevant example.

(b) What are different issues in code optimization ? Explain it with proper example.

(c) Write short notes (any **two**) :

(i) Global Data Flow Analysis

(ii) Loop unrolling

(iii) Loop Jamming.