Printed Pages—3 **ECS603**

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

PAPER ID : 2476 **Roll No.** □□□□□□□□□□

B. Tech.

(SEM. VI) THEORY EXAMINATION 2011-12

COMPILER DESIGN

Time : 3 Hours *Total Marks : 100*

Note : Attempt *all* questions. All questions carry equal marks.

1. Attempt any ***four*** of the following :

(a) Explain the basic structure of compiler.

(b) Describe various compiler writing tools.

(c) Discuss the utility of MACRO.

(d) How bootstrapping is done on more than one machine ?

(e) Discuss merits and demerits of single pass compiler and multipass compiler.

(f) Discuss the implementation of look ahead operator while doing lexical analysis.

2. Attempt any ***four*** of the following :

(a) Is it possible to design a compiler without a distinct lexical analysis phase ?

(b) Explain the rules for construction of the denoted languages alongwith the regular expression construction rules.

(c) What language is generated by following grammar ? In each case justify your answer :

(i) $s \rightarrow 0s1 \mid 01$

(ii) $s \rightarrow +ss \mid -ss \mid a$

(iii) $s \rightarrow s(s)\,s \mid \in$

(d) Discuss input buffering and preliminary scanning in lexical analysis.

(e) Construct minimum state DFA for the following regular expression :

$$(a \mid b)^* \, a \, (a \mid b).$$

(f) What is meant by ambiguous grammar ? How ambiguity is avoided ?

3. Attempt any *two* of the following :

(a) What do you mean by left factoring ? Explain with the help of example how left factoring can be avoided.

(b) Explain how stack implementation of shift reduce parsing is done considering the following grammar :

$$E \rightarrow E + E$$
$$E \rightarrow E * E$$
$$E \rightarrow (E)$$
$$E \rightarrow id$$

and input string is $id_1 + id_2 * id_3$.

(c) Discuss the role of syntax directed translation scheme.

4. Attempt any *two* of the following :

(a) Consider the following grammar :

$$S' = S\#$$
$$S \rightarrow ABC$$
$$A \rightarrow a \mid bb\,D$$
$$B \rightarrow a \mid \in$$
$$C \rightarrow b \mid \in$$
$$D \rightarrow c \mid \in$$

construct the first and follow sets for the grammar, also design a LL(1) parsing table for the grammar.

(b) Explain the working of operator precedence parsing technique with the help of example.

(c) Give three address code for the following :

```
int i,
i = 1
while a < 10 do
if x > y then
a = x + y
else
a = x – y
```

5. Write short notes any *two* of the following :

(a) Local and loop optimization

(b) Induction variable elimination

(c) Errors occurring in different phases of compilers.