

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

**PAPER ID : 2476**

Roll No.

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**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)  $s \rightarrow s(s) s \mid \epsilon$

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

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

$$(a | b)^* a (a | b).$$

(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 :

$$S' = S \#$$

$$S \rightarrow ABC$$

$$A \rightarrow a | bb D$$

$$B \rightarrow a | \epsilon$$

$$C \rightarrow b | \epsilon$$

$$D \rightarrow c | \epsilon$$

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.