



Reg. No. :

Name :

**Sixth Semester B.Tech. Degree Examination, May 2018
(2013 Scheme)**

13.601 : COMPILER DESIGN (FR)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions.

1. What do you mean by ambiguous grammar ? Justify that the given grammar is ambiguous.

$$S \rightarrow xSyS \mid ySxS \mid \epsilon.$$

2. Differentiate between an NFA and a DFA equivalent.

3. Write a note on recursive descent parser with an example.

4. Explain the canonical collection of LR-zero items for the productions given below with GOTO and Closure.

$$S \rightarrow AA$$

$$A \rightarrow aA \mid b$$

5. Write a note on loop optimization with an example.

(5×4=20 Marks)

PART – B

Module – 1

Answer **any one full** question from **each** Module.

1. a) Explain the structure of compiler and all its phases with neat diagram. **10**

- b) Explain the role of finite automata in compiler. Explain BNF notation with an example. **10**

OR

2. a) What do you mean by bootstrapping ? Explain how regular expression is evaluated during compilation. **10**

- b) Explain how compiler writing tools can be used to create a lexical analyser and parser. **10**



Module – 2

3. a) Explain the following recovery methods
- I) Panic Mode Recovery
 - II) Phrase Level Recovery
 - III) Erroneous Productions.
- b) Construct NFA for accepting a strings over the input alphabet {a, b} such that the strings start with 'ab' and ends with 'ba'. Convert the obtained NFA to its equivalent DFA.

OR

4. a) Explain the design of a Lexical analyser for the following input program segment.

```
main ( )
{
    int a;
    a = b * 4 + 2 * 5.6 + 6 * b;
}
```

10

- b) Explain error reporting and error recovery in lexical analyser. Explain 4 issues of compilation.

10

Module – 3

5. Consider the following grammar

$S \rightarrow E \#$

$E \rightarrow E - T$

$E \rightarrow T$

$T \rightarrow F \uparrow T$

$T \rightarrow F$

$F \rightarrow E$

$F \rightarrow i$

- a) Write an algorithm to construct basic finite state control machine for SLR (1) and action and goto function entries.

8

- b) Construct the following for above grammar

i) Basic finite state control

4

ii) SLR (1) parsing table action and goto function entries.

8

OR



6. Consider the grammar

$$E \rightarrow 5 + T \mid 3 - T$$

$$T \rightarrow V \mid V * V \mid V + V$$

$$V \rightarrow a \mid b$$

- a) Write an algorithm to obtain the FIRST and follow table. Obtain FIRST and follow table for the above grammar. 10
- b) Write an algorithm to construct a predictive parsing table. Construct predictive parsing table for above grammar. 10

Module – 4

- 7. a) Write a note on back patching. 4
- b) Write the grammar and syntax directed translation for a simple desk calculator and show annotated parse tree for the expression $(4 5) * (6 + 7)$. 12
- c) Write a note on intermediate code generation of compiler phase with an example. 4

OR

- 8. a) Write a note on sources of sample code generation with an example. 6
 - b) Explain how intermediate codes are generated for boolean expressions. 8
 - c) Propose a code generation scheme for a switch statement. 6
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