Sixth Semester B.Tech. Degree Examination, May 2016
(2013 Scheme)
13.601 : COMPILER DESIGN (FR)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is bootstrapping ?

2. What is a regular expression ? Give the regular expression for the following set of strings over (a, b, c)

   i) that contain exactly one b

   ii) containing even number of a's.

3. Identify whether the following grammar is ambiguous :

   $G = \{(S), \{a, b\}, \{S \rightarrow SaS, S \rightarrow b\}, S\}$

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4. Differentiate between synthesized attribute and inherited attribute.

5. Translate the conditional statement if a < b then 1 else 0 into three address code.

PART – B

Answer **any one** question from **each** module.

Module – 1

6. a) Explain in detail the phases of a compiler with a diagram. Illustrate the output of each phase of compilation for the input "x = a + b + b + a". **10**

   b) Write a CFG to describe the syntax of if-else statement ? Is the grammar ambiguous ? Justify. **10**

OR

7. a) Consider the following grammar :

S → aAcBe

A → Ab | b

B → d. Write the grammar in BNF notation. 10

b) Find the handles for input string "abbcde". 10

Module – 2

8. a) Indicate the phase of a compiler that can detect each of the following error :

i) Operators with incompatible types

ii) Compiler created constant that is too large to fit in a word in the target machine. 10

b) Explain how Lexical analyser processes the following program segment.

```
for (int a = 0 ; a < 10 ; a ++)
    { printf ("hello world") ;
    }
```

OR

9. Construct a minimum state DFA for the following Regular expression. 20

(a|b)*a(a|b) (a|b) (a|b)

Module – 3

10. Construct an SLR parsing table for the grammar,

bexpr → bexpr or berm|bterm

bterm → bterm and bfactor|bfactor

bfactor → not bfactor|(bexpr)|true|false 20

OR

11. Consider the following grammar

$S \rightarrow CC$

$C \rightarrow cC \mid d$

Check whether the grammar is LR (0) by construct a suitable parse table for the grammar. Show the actions of the parser for a sample input string. 20

Module – 4

12. a) Construct a DAG for the basic block.

d=b*c

e=a+b

b=b*c

a=e – d 10

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b) Simplify the above three address code, assuming a, b and c live on exit from the block. 10

OR

13. Rewrite the following Syntax Directed translation :

$A \rightarrow A(a)\,B \mid AB(b) \mid 0$

$B \rightarrow B(c)\,A \mid BA\,(d) \mid 1$

So that the underlying grammar becomes non-left recursive. Here a, b, c and d are actions, 0 and 1 are terminals. 20

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