Registration No. : | | | | | | | | | | |

Total number of printed pages – 3

B. Tech

PCCS 4305

Sixth Semester Examination – 2013

COMPILER DESIGN

BRANCH : IT

QUESTION CODE : A229

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*

The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) What is an ambiguous grammar ? Give an example.

   (b) What are the drawbacks of SLR(1) parser ?

   (c) Explain the concept of bootstrapping in a compiler design process.

   (d) What is DAG ? What are its uses ?

   (e) What is backpatching ? Explain with an example ?

   (f) What are induction variables ? Give an example.

   (g) How an inherited attribute differs from a synthesized attribute ?

   (h) Explain the difference between Bottom-up and Top-down parsing.

   (i) What is the need of attributed grammar and L-attributed grammar in semantics analysis ?

   (j) Write a regular expression to describe unsigned numbers.

2. (a) Explain in detail the various phases of compiler. Describe the output for the following expression after each phase 5

   *position: = initial + rate * 90*

(b) Draw a NFA for the grammar 5

$(x \mid y)^* x y y$

Hence find its equivalent DFA.

3. (a) Discuss LL(1) parsing method for the following grammar 5

$E \rightarrow TE'$

$E' \rightarrow +TE' \mid \in$

$T \rightarrow FT'$

$T' \rightarrow *FT' \mid \in$

$F \rightarrow (E) \mid id$

Consider the predictive parsing table and show the stack implementation for the input string id + id*id

(b) What is the need for input buffering in a scanner ? How do you organize the buffering effectively ? Discuss. 5

4. Consider the following grammar

$S \rightarrow CC$

$A \rightarrow cC \mid d$

(a) Show that the grammar is LR(1) or not. 5

(b) Show that the grammar is LALR or not. 5

5. (a) What is DAG ? Write an algorithm to construct DAG from the block of three address code. Construct the DAG for the following basic block : 5

a : = b + c

b : = a – d

c : = b + c

d : = a – d

(b) What are the issues in the design of the code generator ? Explain. 5

6. (a) What is objective of intermediate code generation ? Write Quadruples, Triples and Indirect Triples for the following expression : 5

$-(a + b) * (c + d) - (a + b + c)$

(b) What information is recorded in the symbol table of a compiler for a block structured language ? Explain with example. 5

7. (a) Write the role of error detector in compilation process with example. Discuss different errors in Lexical phase. 5

(b) Compare three different storage allocation strategies. 5

8. (a) Explain different code optimization techniques used in compilation process to generate optimized code. 5

(b) Discuss in detail the allocation of registers during code generation. 5