C 61504

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Name.................

Reg. No................
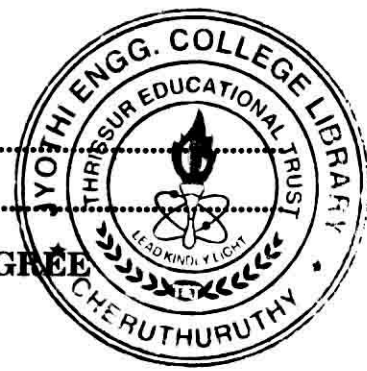
SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, APRIL 2014

(2009 Scheme)

IT/CS/PTCS 09 602—COMPILER DESIGN

(Regular/Supplementary/Improvement)

Time : Three Hours

Maximum : 70 Marks

Part A

Short Answer Questions. (one / two sentences).
*Answer **all** the questions.*
Each question carries 2 marks.

1. What data structures are used in the implementation of a symbol table ?

2. How does the tool LEX help in the recognition of tokens ?

3. List the issues in a Shift Reduce Parser.

4. Is the following grammar G, LL (1) ?

   $E \rightarrow A \,|\, B \quad A \rightarrow a \,|\, c \quad B \rightarrow b \,|\, c.$

5. State the issues in the design of a Code generator.

(5 × 2 = 10 marks)

Part B

*Answer any **four** questions.*
Analytical / Problem solving questions.

6. What are the various phases of the compiler ? Explain each phase in detail.

7. Construct the predictive parser for the following grammar :

   $S \rightarrow (L)/a$
   $L \rightarrow L, S/S$

8. Construct the syntax tree for the following assignment statement :
   $a := b * - c + b * - c$

9. Explain the principal sources of optimization in detail.

10. Construct the dag for the following basic block :

    $d := b * c$
    $e := a + b$
    $b := b * c$
    $a := e - d$

Turn over

11. Explain in detail about the various issues in design of code generator.

$(4 \times 5 = 20 \text{ marks})$

Part C

*Answer **all** questions.*

Descriptive / Analytical / Problem solving questions.

12. (a) In the context of a complier, briefly describe the output of each major compilation phases for the assignment statement $x = y * z + 3 + 2$, where x, y, z, are real numbers. State any assumptions you make.

Or

     (b) Construct SLR parsing table for the given grammer

          $S \rightarrow CC$
          $C \rightarrow cC/d$

13. (a) Consider the following simple context free grammar :

          $G \rightarrow S \quad S \rightarrow x \quad S \rightarrow Ay \quad A \rightarrow Bx \quad B \rightarrow z.$

          Is this grammar LR (1) ? Justify. Trace for the string $w = zxy$.

Or

     (b) Explain how LALR parsing table is constructed. Develop an algorithm for the same.

14. (a) Explain how DAGs will help in intermediate code generation ? Construct a DAG and a three address-code for the expression $a + a*(b - c) + (b - c)*d$.

Or

     (b) Discuss why buffering is required while recognizing lexemes? Explain how sentinels are handled using buffers.

15. (a) What are the different code optimization techniques available in local and global optimization ? Illustrate each with an example.

Or

     (b) Explain a simple code generation algorithm for the code segment as follows :

          $W = (x + z) - (x - y).$

$(4 \times 10 = 40 \text{ marks})$