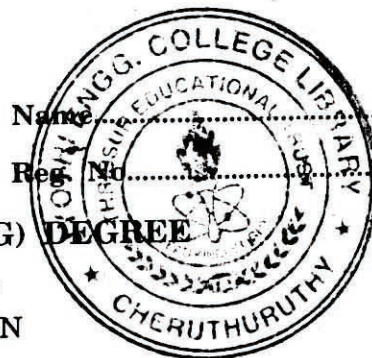C 41296

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SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, MAY 2013

IT/CS/PTCS 09 602—COMPILER DESIGN

(2009 Admission onwards)

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. What is CFG ? Explain with an example.

2. Define handle pruning.

3. What are the LR (0) items ?

4. What is Left recursion ? Write the rules to eliminate left recursion.

5. Construct DAG for the following expression $(a + b) - (e - (c + d))$.

$(5 \times 2 = 10$ marks)

Part B

Answer any four questions.

6. Discuss the compiler construction tools.

7. Compute the FIRST and FOLLOW sets of each of the non-terminals for the following grammar :—

   P-> AQRbe | mn | DEi

   A-> ab | $\in$

   Q-> q1q2 | $\in$

   R-> r1r2 | $\in$

   D-> d

   E-> e.

8. Discuss the problems in top-down parsers. Explain how to overcome them.

9. Compare Inherited attributes and Synthesized attributes with an example.

10. Discuss about the stack allocation strategy of runtime environment with an example.

11. Explain the loop optimization.

$(4 \times 5 = 20$ marks)

Turn over

Part C

12. (a) (i) What are the various tasks performed on the analysis and synthesis phases of a compiler ?

                                                           (2 marks)

      (ii) With a neat diagram explain the various phases of a compiler. List the various compiler construction tools you know.

                                                           (8 marks)

Or

(b) For the following source language statement show the output at each phases of a compiler :—

$y = a*b + a*b$

13. (a) Draw the DFA for the following regular expression :—

$(x \mid y)* \, xyy \, (x \mid y)*$

Or

(b) Construct LALR (1) Parser for the following grammar :—

$S \rightarrow iCtS \mid iCtSeS \mid a$

$C \rightarrow b$

Is there any conflicting entries.

14. (a) Explain with a suitable example the mechanism used by compiler to handle procedure parameters.

Or

(b) Construct quadruples, Triples, and Indirect Triples of the following expression :—

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

15. (a) (i) What is flow-graph ? Explain how given program can be converted into flowgraph.

                                                           (7 marks)

      (ii) What do you mean by Peep-hole optimization.

                                                             (3 marks)

Or

(b) Explain issues in the design of a code generator.

                                                            [4 × 10 = 40 marks]