

Code No: 156CP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year II Semester Examinations, February - 2023****PRINCIPLES OF COMPILER CONSTRUCTION****(Common to IT, ITE)****Time: 3 Hours****Max. Marks: 75**

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) Define Finite Automata and Regular Expression. [2]
- b) Convert the following regular expression to DFA: $(a^*|b^*)^*$. [3]
- c) Why do we need LR parsers? [2]
- d) What are the advantages and disadvantages of predictive parsers? [3]
- e) Define synthesized attributes and inherited attributes. [2]
- f) What is a Dependency graph? Give an example. [3]
- g) What is meant by DAG? [2]
- h) Write down the algorithm to partition a three-address code into basic blocks. [3]
- i) Define a flow graph. [2]
- j) How to compute IN and OUT statements in data flow analysis? [3]

PART – B**(50 Marks)**

- 2.a) Discuss the role of the Lexical Analyzer.
- b) How a compiler differs from an assembler and an interpreter? Describe the structure of a language processing system with a neat diagram. [5+5]

OR

- 3.a) Why analysis portion of a compiler is normally separated into lexical analysis and syntax analysis phases?
- b) Discuss the problem of recognizing and specifying lexemes in the input. [4+6]
- 4.a) What are the techniques to eliminate ambiguity in the grammar? With the help of the algorithm and example, explain them.
- b) Write down the differences between top-down parsers and bottom-up parsers. [6+4]

OR

5. Construct SLR parser table for the following grammar by computing item sets: [10]
 $E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E)/id$

6. Design an S-attributed SDD for the following grammar that generates binary numbers with a “decimal” point. [10]

$S \rightarrow L . L \mid L$ $L \rightarrow L B \mid B$ $B \rightarrow 0 \mid 1$

OR

7. Discuss briefly about Three-Address code and translate the following arithmetic expression

$a + - (b + c)$ into :

- a) a syntax tree
- b) quadruples
- c) triples
- d) indirect triples. [10]

8. What are the important types of local optimizations that can be applied to basic blocks? Explain them with a illustrative examples. [10]

OR

- 9.a) Mention the issues in the design of a code generator.
- b) Outline various storage allocation strategies. [5+5]

10. Explain the purpose of optimization using global data-flow analysis with relevant example. [10]

OR

11. Explain the following loop optimization techniques with an example:
- a) Code motion
 - b) Induction-variable elimination
 - c) Strength Reduction. [3+4+3]

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