

**R18**

**Code No: 156AH**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech III Year II Semester Examinations, February - 2023**

**COMPILER DESIGN**  
**(Computer Science and Engineering)**

**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 linker and loader. [2]
- b) Write a short note on regular expression. [3]
- c) Explain context free grammar. [2]
- d) Compute FIRSTs and FOLLOWs for the following grammar  
 $R \rightarrow R+R, R \rightarrow R*R, R \rightarrow R/R, R \rightarrow (R), R \rightarrow id$  [3]
- e) What are the evaluation orders for syntax directed definitions? [2]
- f) Explain the variants of syntax trees. [3]
- g) What is trace based collection? [2]
- h) Explain the addresses in the target code. [3]
- i) Define strength reduction. [2]
- j) Discuss about common sub expression elimination. [3]

**PART – B**

**(50 Marks)**

2. Define compiler. Explain various phases of compiler with neat sketch. [10]

**OR**

- 3.a) Explain various error recovery strategies in lexical analysis.
- b) Construct a Finite automata and scanning algorithm for recognizing identifiers, numerical constants in 'C' language. [5+5]

- 4.a) What is left recursion? Describe the algorithm used for eliminating left recursion.
- b) Eliminate left recursion in the following grammar:  
 $E \rightarrow E + T / T, T \rightarrow T * F / F, F \rightarrow (E) / id$  [5+5]

**OR**

- 5.a) Write an algorithm for computing LR(K) item sets.
- b) Differentiate between Top down and Bottom up parsing techniques. [5+5]

- 6.a) Construct a Quadruple, Triple and Indirect triple for the statement  
 $a + a * (b - c) + (b - c) * d$
- b) How are inherited attributes differ from synthesized attributes? [6+4]

**OR**

7. Give syntax directed translation scheme for simple desk calculator. [10]

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8. Explain various storage allocation strategies with an example.

[10]

**OR**

9.a) What is a basic block? How to construct a basic block?  
b) Explain peephole optimization with an illustrative example.

[5+5]

10. Explain the following with an example

a) Constant Propagation

b) Partial Redundancy Elimination.

[5+5]

**OR**

11.a) Explain loop optimization techniques with example.  
b) Explain various notations used in data flow analysis.

[5+5]

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