

# Atal Bihari Vajpayee-Indian Institute of Information Technology & Management, Gwalior

## IT302: Compiler Design

Major Examination (Session 2023–24)

Maximum Time: 3 Hours

Max Marks: 45

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*Note: Attempt all questions. Answers must be well supported with diagrams/illustrations wherever applicable.*

1. (a) Explain the role of lexical analyzer in compiler construction. (b) Design a finite automaton for the identifier tokens in a programming language. (8 Marks)
2. (a) Discuss the concepts of FIRST and FOLLOW in syntax analysis with an example. (b) Construct an LL(1) parsing table for the grammar:

$$S \rightarrow Aa \mid b, \quad A \rightarrow c \mid \epsilon$$

(8 Marks)

3. (a) Explain shift-reduce parsing with an example. (b) Differentiate between LR(0) and SLR(1) parsers. (7 Marks)
4. (a) What are three-address codes? Give examples. (b) Explain DAG representation of expressions. (7 Marks)
5. (a) Discuss code optimization techniques. (b) Explain loop optimization with an example. (8 Marks)
6. Write short notes on any two: (i) Syntax-directed translation (ii) Peephole optimization (iii) Error recovery methods (7 Marks)