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

IT302: Compiler Design

Major Examination (Session 2024–25)

Maximum Time: 3 Hours **Max Marks: 45**

Note: Answer all questions. Clarity in reasoning and neat diagrams will be rewarded.

1. (a) Explain the role of lexical analysis in compiler design. (b) Design a finite automaton for identifiers of a programming language. (7 Marks)

2. (a) What is ambiguity in grammars? Give an example and resolve it. (b) Construct the FIRST and FOLLOW sets for the grammar:

$$S \to AB, \quad A \to aA \mid \epsilon, \quad B \to bB \mid c$$

(8 Marks)

3. (a) Explain operator-precedence parsing with an example. (b) Differentiate between LR(0), SLR(1), and LALR parsers. (8 Marks)

4. (a) Define three-address code. Generate TAC for the expression:

$$(a + b) * (c - d)/e$$

(b) Explain backpatching with an example. (7 Marks)

5. (a) Discuss the need for code optimization. (b) Explain loop-invariant code motion with a suitable example. (8 Marks)

6. Write short notes on any two: (i) Syntax-directed definitions (ii) Peephole optimization (iii) Error recovery methods in parsing (7 Marks)