

National Institute of Technology, Delhi

Name of the Examination: B.Tech.

Mid Semester Examination (Spring, February-2026)

Branch

: Computer Science and Engineering

Semester

: VI

Title of the Course

: Compiler Design

Course Code

: CSBB 351

Time: 1.5 Hour

Maximum Marks: 25

Note: All questions are compulsory.

COURSE OUTCOMES		COGNITIVE LEVELS
CO1	Understand the structure and identify the phases of compilers for a programming language.	L1, L2
CO2	Learn Context-free grammars, compiler parsing techniques, construction of abstract syntax trees.	L3
CO3	Generate syntax-directed translation rules for a given context-free grammar by examining S-attributed and L-attributed grammars and practice of compiler implementation and generate intermediate code by applying various code optimization strategies.	L4
CO4	Build a domain-specific mini compiler.	L5

Attempt all questions from each section.

Section-A (1x 5 = 5 Marks)		CO	BL	PO
Qs. No.	Question			
1.	Count the number of tokens in C code segment. main () { char * s[] = {"ice", "green", "water", "hi"}; char ** ptr[] = {s + 3, s + 2, s + 1, s}; char *** p = ptr; printf("in, % s", ** ++ P); }	1	L2	1, 12
2.	What is Handle and Handle Pruning?	1	L1	1, 12
3.	Consider the following grammar and eliminate left recursion. A → ABd / Aa / a B → Be / b	2	L3	1, 2
4.	A compiler that runs on one machine and generates code for another machine is called _____.	1	L1, L2	1, 12
5.	What are the goal criteria for compilers?	1	L1	1

Section-B (2.5 x 4 = 10 Marks)		CO	BL	PO
Qs. No.	Question			
6.	Symbol table accessed during which phase/phases of compiler? Draw a diagram to show the interaction of symbol table with phase/phases during a compilation of a program (e.g C program).	1	L2	1
7.	You are given the following token specifications: Identifier: letter (letter digit)* Integer: digit+ Operators: +, -, *, / Relational: <, <=, >, >=, == (a) Write regular expressions for all tokens. (b) Explain how lexical analyzer handles errors.	1	L2	1, 12
8.	Given the statement: int x = a + b * 5; (a) Identify which compiler phase handles tokenization, type checking, operator precedence handling, and intermediate code generation. (b) Explain how grouping of phases improves compiler efficiency.	1	L2	1, 12
9.	Create a table comparing the key differences between compilers and interpreters. Identify the scenarios where each one is more suitable.	1	L2	1

Section-C (5 x 2 = 10 Marks)		CO	BL	PO
Qs. No.	Question			
10.	What is the number of states in canonical set LR(0) items for the given CFG Grammar G = ({S, A, B}, S, {a, b, x}, P) with P: S → Axb A → aAb B B → x	2	L3	2, 12
11.	Consider the following grammar: S → AB eDa A → ab c B → dC C → eC ε D → fD ε (a) Compute First and Follow of the grammar. (b) Construct a LL(1) parsing table. (c) Is this grammar LL(1)? Justify. (d) Parse a string : abdeee (show stack movement)	2	L3	2, 12