

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech II Semester Regular/Supplementary Examinations, November -2025
COMPILER DESIGN
(CSE)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

UNIT-I			
1.	a)	Explain the structure of a compiler and the processes involved in generating and recognizing a token.	[7M]
	b)	Discuss the concept of bootstrapping in compiler design. How does it contribute to the development of a compiler?	[7M]
(OR)			
2.	a)	Apply the concept of constructing a finite automaton for a given a set of regular expressions. Demonstrate using a suitable example.	[7M]
	b)	For the given expression generate the tokens and the corresponding syntax tree. Further identify the types of token generated. (a+b-c=5);	[7M]
UNIT-II			
3.	a)	List the steps involved in constructing SLR parsing tables. What are the key differences between SLR and LALR parsing techniques?	[7M]
	b)	1. $S \rightarrow A B$ 2. $A \rightarrow a \mid \epsilon$ 3. $B \rightarrow b$ Define LL(1) Parsing. Given the input string ab, show the parsing process using the LL(1) table.	[7M]
(OR)			
4.	a)	1. $S \rightarrow A A$ 2. $A \rightarrow a \mid b$ Determine whether this grammar is LL(1). If it is not, modify it to create an equivalent LL(1) grammar and construct the LL(1) parsing table.	[7M]
	b)	Explain the process of error recovery in predictive parsing. How does backtracking enhance the parsing capabilities of a compiler?	[7M]
UNIT-III			
5.	a)	Propose an intermediate code generation scheme for a language that supports both procedures and expressions. Explain the steps and structures involved.	[7M]
	b)	Define syntax-directed definitions (SDDs). What are the evaluation orders for SDDs, and why are they important?	[7M]
(OR)			
6.	a)	Describe the role of type checking in intermediate code generation. How does it affect the overall compilation process?	[7M]
	b)	Discuss the Three-Address Code (TAC) representation in Intermediate Code Generation. Explain different types of three-address instructions with examples.	[7M]
UNIT-IV			
7.	a)	Describe the concept of flow graphs and their role in code optimization. How	[7M]

		do flow graphs help in loop optimization? Explain with an example.	
	b)	What are basic blocks in code optimization? Explain the process of constructing basic blocks and optimizing them using various transformations	[7M]
		(OR)	
8.	a)	Analyze the impact of peephole optimization on generated code. How does it improve performance without affecting the overall structure?	[7M]
	b)	$p = (x + y) * z$ $q = x + y$ $r = q * z$ Construct a Directed Acyclic graph for code optimization by removing the common subexpression.	[7M]
		<u>UNIT-V</u>	
9.	a)	Define and discuss the significance of run-time storage allocation and its significance in the context of program execution. What are activation records?	[7M]
	b)	Assess the importance of activation records in run-time environments. How do they contribute to the management of procedure calls?	[7M]
		(OR)	
10.	a)	Explain the issues involved in designing a code generator. Discuss how object code forms can affect the efficiency of code generation.	[7M]
	b)	Analyze the techniques used for optimizing code during the generation phase. Discuss loop unrolling, instruction scheduling	[7M]
