



R22 Regulation

Subject code: 4E6EB

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Regular Examinations, May 2025

## COMPILER DESIGN

(CSE)

Maximum Marks: 60

Date: 18.06.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

### Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Write the regular expressions over $\{0,1\}$ , which denotes the set of all strings not containing 100 as a sub string.	1M	CO1	L1
b)	What are tokens, how tokens are generated?	1M	CO1	L1
c)	What is an Ambiguous grammar?	1M	CO2	L1
d)	Compare and contrast top down and bottom-up parsing.	1M	CO2	L2
e)	List the applications of syntax direction translation.	1M	CO3	L4
f)	Explain the purpose of backpatching.	1M	CO3	L2
g)	What is stack allocation? How is space allocated and deallocated?	1M	CO4	L1
h)	Define a flow graph.	1M	CO4	L1
i)	Why is loop optimization important in compilers?	1M	CO5	L1
j)	List the principal sources of optimization.	1M	CO5	L4

### Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Explain the various phases of a compiler in detail. Also write down the output for the following expression after each phase a: $=b*cd$	10M	CO1	L2
OR				
3	a) Explain the role of Lexical analyser in a compiler b) Convert the following regular expression to finite automata $01(0+1)^* + (00+1)^*11$	5M 5M	CO1	L2, L3
4	a) What is left factoring? Describe the algorithm for left factoring a grammar with an example? b) Construct SLR parsing table for the following grammar $E \rightarrow E+T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid id$	5M 5M	CO2	L1, L3
OR				
5	a) Construct LALR Parsing table for the grammar $S \rightarrow L=R/R$ $L \rightarrow *R/id$ $R \rightarrow L$	5M	CO2	L2

	<p>b) Define Ambiguous Grammar? Check whether the grammar</p> $S \rightarrow aAB,$ $A \rightarrow bC/cd,$ $C \rightarrow cd,$ $B \rightarrow c/d$ <p>Is Ambiguous or not?</p>	5M		
6	<p>a).What is a Syntax-Directed Translation Scheme? How does it differ from an SDD?</p> <p>b).Explain the structure and purpose of intermediate code in compiler design. Why is it necessary?</p>	5M 5M	CO3	L1
OR				
7	<p>a) Discuss the three-address code format. What are its types and how is it used in representing complex expressions?</p> <p>b) Discuss the implementation of L-attributed SDDs in bottom-up parsing. What are the challenges and solutions.</p>	5M 5M	CO3	L3
8	<p>a) Write the code generation for the <math>d := (a-b) + (a-c) + (a-c)</math>.</p> <p>b) What is a basic block? How are basic blocks and flow graphs used for code optimization?</p>	6M 4M	CO4	L1
OR				
9	<p>a) What is peephole optimization? Discuss its benefits and limitations with examples.</p> <p>b) What is garbage collection? Explain different types with a focus on trace-based collection methods.</p>	5M 5M	CO4	L1
10	<p>What is data flow analysis? Describe its role in machine-independent code optimization.</p>	10M	CO5	L1
OR				
11	<p>a) Explain the process of constructing a control flow graph (CFG) and its use in optimizations.</p> <p>b) Compare and contrast constant folding and constant propagation. How do they relate to data flow analysis?</p>	5M 5M	CO5	L2