CSE 6th

(T) Roll No. .....

PAPER ID—11443

B. Tech. EXAMINATION, 2026

(Sixth Semester)

COMPILER DESIGN

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) While compiling a program, the compiler reports an illegal character error. Which phase of the compiler detects this error ?

(b) What are the uses of regular expressions in lexical analysis ?

(c) What do you mean by left factoring the grammars ? Explain.

(d) A parser receives the input string id + id * id. Which parsing technique ensures that multiplication is evaluated before addition ?

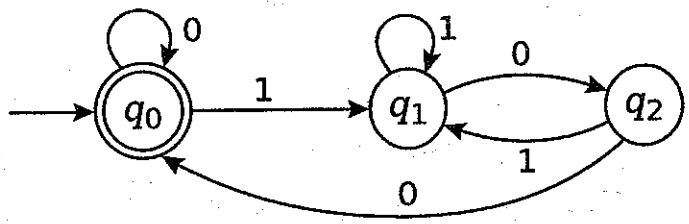
(e) Why is LALR parsing commonly used in parser generators like YACC ? How is postfix notation generated using Syntax Directed Translation Schemes ?

(f) Give examples of code optimization techniques.

(g) List the data structures used to implement symbol tables. 7×2=14

Unit I

2. (a) Find regular expression for the given diagram : 7



(b) Explain the implementation of a lexical analyzer with suitable examples. 7

3. (a) Find an automaton equivalent to given regular expression :

ba + (a + bb)a*b. 7

(b) Discuss the different phases of a compiler and explain the function of each phase. 7

Unit II

4. (a) Given the grammar :

$S \rightarrow aAB$

$A \rightarrow aA \mid b$

$B \rightarrow bB \mid a.$

Identify whether the string aaabb can be generated by the grammar and explain the derivation steps. 7

(b) If a grammar is ambiguous and produces multiple parse trees for the same expression, explain, how it affects syntax analysis and how can it be resolved ? 7

5. (a) Given the grammar :

$S \rightarrow aA \mid bB$

$A \rightarrow c$

$B \rightarrow d$

Construct the predictive parsing table. 7

(b) A grammar for arithmetic expressions is given :

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

Construct the parse tree for the expression id + id * id. 7

Unit III

6. (a) For the grammar :

$S \rightarrow CC$

$C \rightarrow cC \mid d$

Construct the SLR parsing table and demonstrate parsing of the string cdcd. 7

(b) Design a syntax-directed definition (SDD) to evaluate arithmetic expressions and demonstrate the evaluation for 3 + 7* 8. 7

7. (a) Generate three-address code and triples for the expression :

a = b + c * d – e. 7

(b) Explain the concept of intermediate code generation and its importance in compiler design. 7

Unit IV

8. (a) Analyse the following code segment and explain how dead code elimination can improve it :

$a = 5$; $b = 10$; $a = 7$. 7

(b) Explain different strategies used for register allocation in compilers. 7

9. (a) Describe the lexical phase errors, syntactic error and semantic errors in detail. 7

(b) A program contains 10,000 identifiers. Which data structure would be most efficient for implementing the symbol table ? Justify your choice. 7

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