

Code No: **R20A1202****MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY****(Autonomous Institution – UGC, Govt. of India)****III B.Tech I Semester Supplementary Examinations, June 2025****Automata and Compiler Design****(CSE-CS & CSE-DS)**

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Time: 3 hours**Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing **ONE** Question from each SECTION and each Question carries 14 marks.

SECTION-I

- | | | | BCLL | CO(s) | Marks |
|---|----------|---|-------------|--------------|--------------|
| 1 | <i>A</i> | Illustrate the construction of Non Deterministic Finite Automata for the Regular Expression: $(a+b)^*a$. | L2 | CO-I | [7M] |
| | <i>B</i> | Outline the procedure to convert NFA to its equivalent DFA | L2 | CO-I | [7M] |
| | | OR | | | |
| 2 | <i>A</i> | How do you recognize the tokens? Explain it. | L1 | CO-I | [7M] |
| | <i>B</i> | Construct DFA to accept strings with c and d such that number d's are divisible by 4 where $\Sigma = \{c,d\}$ | L2 | CO-I | [7M] |

SECTION-II

- | | | | | | |
|---|----------|---|-----------|--------------|-------------|
| 3 | <i>A</i> | Compute FIRST and FOLLOW for the following grammar.
$S \rightarrow A, A \rightarrow aB \mid Ad \mid B \rightarrow bBC \mid f \mid C \rightarrow g$. | L6 | CO-II | [7M] |
| | <i>B</i> | c) Explain the phases of the compiler. | L3 | CO-II | [7M] |
| | | OR | | | |
| 4 | <i>A</i> | Considering the following grammar, remove left recursion and left factor and design LL(1) parsing table.
$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$ | L1 | CO-II | [7M] |
| | <i>B</i> | Relate the lexical analysis with parsing. | L1 | CO-II | [7M] |

SECTION-III

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|---|----------|---|-----------|---------------|-------------|
| 5 | <i>A</i> | Explain about Chomsky hierarchy of languages and recognizer. | L2 | CO-III | [7M] |
| | <i>B</i> | Examine how the names can be looked up in the symbol table? | L4 | CO-III | [7M] |
| | | OR | | | |
| 6 | <i>A</i> | Explore about the context sensitive features and identify the relation between the recursive and context sensitive language | L2 | CO-III | [7M] |
| | <i>B</i> | Identify the advantages and disadvantages of LR Parser. | L2 | CO-III | [7M] |

SECTION-IV

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|---|----------|--|-----------|--------------|-------------|
| 7 | <i>A</i> | What do you mean by loop optimization? Illustrate with an example. | L1 | CO-IV | [7M] |
| | <i>B</i> | What is the use of Frequency Reduction? Give an example. | L1 | CO-IV | [7M] |
| | | OR | | | |
| 8 | <i>A</i> | Consider the following loop, generate three address code and draw the flow graph:
Begin | L6 | CO-IV | [7M] |

```

Prod=0
i=1
do
Begin
Prod=Prod+a[i]*b[i]
i=i+1
End
While (i≤20)
End.

```

B Write and explain about Peephole Optimization. **L1** **CO-IV** **[7M]**

SECTION-V

9 **A** Write and explain about organization for an optimizing compiler. **L2** **CO-V** **[7M]**

B Explain how copy propagation can be done using data flow equation **L2** **CO-V** **[7M]**

OR

10 **A** Explain in detail about machine dependent code optimization. **L4** **CO-V** **[7M]**

B What are the applications of DAG? Explain how the following expression can be converted in a DAG. $a+b*(a+b)+c+d$ **L1** **CO-V** **[7M]**
