

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. III Year I Semester Regular Examinations December-2025

AUTOMATA THEORY AND COMPILER DESIGN

(Common to CSE & CSIT)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

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|---|---|--|-----|----|----|
| 1 | a | Define Finite Automata. | CO1 | L1 | 2M |
| | b | Describe Regular Expression with example. | CO1 | L1 | 2M |
| | c | State what is derivation with example. | CO2 | L1 | 2M |
| | d | Define Ambiguous grammar with examples. | CO2 | L1 | 2M |
| | e | Define Compiler. | CO3 | L1 | 2M |
| | f | List all the phases of compiler. | CO2 | L1 | 2M |
| | g | Define augmented grammar. | CO5 | L1 | 2M |
| | h | Describe FIRST and FOLLOW with example. | CO5 | L1 | 2M |
| | i | Define DAG with example. | CO6 | L1 | 2M |
| | j | List all the issues in the design of a code generator. | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|---|-----|----|----|
| 2 | a | Compare DFA and NFA. | CO1 | L4 | 5M |
| | b | Design DFA which accepts even number of 0's and odd number of 1's over {0,1}. | CO1 | L6 | 5M |

OR

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|---|---|--|-----|----|----|
| 3 | a | Discuss about the Closure properties of Regular Sets. | CO1 | L2 | 5M |
| | b | Construct an equivalent FA for the given regular expression using Bottom up approach $(0+1)^*(00+11)(0+1)^*$ | CO1 | L6 | 5M |

UNIT-II

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|---|---|--|-----|----|----|
| 4 | a | What is left recursion? Eliminate left recursion for the following grammar
$E \rightarrow E+T/T \quad T \rightarrow T * F/F \quad F \rightarrow (E)/id$ | CO2 | L3 | 5M |
| | b | Evaluate simplification of the following context free grammar.
$S \rightarrow Aa/B \quad B \rightarrow a/bC \quad C \rightarrow a/\epsilon$ | CO2 | L5 | 5M |

OR

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| 5 | | Explain the procedure to Construct an equivalent PDA from a CFG and adapt the same for the given grammar.
$S \rightarrow aAB \mid bBA \quad A \rightarrow bS \mid a \quad B \rightarrow aS \mid b.$ | CO2 | L6 | 10M |
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UNIT-III

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| 6 | a | Describe Instantaneous Description of Turing Machine. | CO2 | L2 | 5M |
| | b | Explain about the graphical notation of TM. | CO2 | L2 | 5M |

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| 7 | | Design the compiler by using the
source program position = initial + rate * 60. | CO3 | L3 | 10M |
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UNIT-IV

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| 8 | | Construct CLR Parsing table for the given grammar : $S \rightarrow CC \quad C \rightarrow aC/d$ | CO5 | L6 | 10M |
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| 9 | | Analyse different types of Intermediate Code with an example. | CO5 | L4 | 10M |
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UNIT-V

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| 10 | | Analyse different types of optimization techniques of basic blocks. | CO6 | L4 | 10M |
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| 11 | a | Analyse the different forms in target program. | CO6 | L4 | 5M |
| | b | Analyse Simple code generator. | CO6 | L4 | 5M |

*** END ***