

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

**B.Tech III Year I Semester Regular & Supplementary Examinations February-2024**  
**AUTOMATA THEORY AND COMPILER DESIGN**

(Common to CSM & CIC)

**Time: 3 Hours**

**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a Construct DFA for the given NFA

CO2 L6 8M

	Next state	
	0	1
→ q0	q0, q1	q0
q1	q2	q1
q2	q3	q3
⊙ q3	-	q2

- b Define alphabets, strings, Languages.

CO1 L3 4M

- 2 a Define Melay machine and Moore machine.

CO3 L1 4M

- b Prove that  $L = \{a^i b^i \mid i \geq 0\}$  is not regular

CO3 L3 8M

**UNIT-II**

- 3 a Convert the following grammar into CNF.

CO4 L3 10M

$S \rightarrow bA/aB$

$A \rightarrow bAA/aS/a$

$B \rightarrow aBB/bS/a.$

- b State Turing machine.

CO6 L1 2M

OR

- 4 a Construct a TM for regular Expression  $01(00+11)(0+1)^*1$

CO6 L6 8M

- b Remove the unit production from the grammar

CO4 L3 4M

$S \rightarrow AB$

$A \rightarrow E$

$B \rightarrow C$

$C \rightarrow b$

$E \rightarrow a$

**UNIT-III**

- 5 Explain the phases of a compiler with a neat diagram.

CO2 L2 12M

OR

- 6 a Find FIRST and FOLLOW for the following grammar. CO2 L3 6M  
E → E+T/T  
T → T\*F/F  
F → (E)/id
- b Explain Left recursion and Left factoring. CO1 L2 6M

**UNIT-IV**

- 7 Construct CLR Parsing table for the given grammar. CO3 L6 12M  
S → CC  
C → aC/d

OR

- 8 a Define a syntax-directed translation and explain with an example. CO2 L2 8M  
b Describe bottom-up parsing. CO2 L1 4M

**UNIT-V**

- 9 a Construct the DAG for the following basic blocks CO6 L6 8M  
i. t1:=4\*i  
ii. t2:=a[t1]  
iii. t3:=4\*i  
iv. t4:=b[t3]  
v. t5:=t2\*t4  
vi. t6:=prod+t5  
vii. prod:=t6  
viii. t7:=i+1  
ix. i:=t7  
if i<=20 goto 1
- b Describe about loop optimization technique. CO5 L2 4M

OR

- 10 a Define flow Graph. CO4 L1 2M  
b Explain the peephole optimization Technique with examples. CO5 L2 10M

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