

Reg. No: 

--	--	--	--	--	--	--	--	--	--

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

**B.Tech II Year II Supplementary Examinations March 2021**  
**FORMAL LANGUAGES AND AUTOMATA THEORY**  
(Common to CSE & CSIT)

Time: 3 hours

Max. Marks: 60

**PART-A**

(Answer all the Questions 5 x 2 = 10 Marks)

- 1 a Define Moore and Mealy Machine. 2M
- b Reg exp for the language such that every string will have atleast one 'a' followed by atleast one 'b'. 2M
- c What are the three ways to simplify a context free grammar? 2M
- d Is NPDA (Nondeterministic PDA) and DPDA (Deterministic PDA) equivalent. 2M
- e Differentiate recursive and recursively enumerable languages. 2M

**PART-B**

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

**UNIT-I**

- 2 a Consider the below finite automata and check the strings are accepted or not

States (Q)	Input Alphabtes	
	0	1
→q0	q1	q3
q1	q0	q2
(q2)	q3	q1
q3	q2	q0

5M

(i) 1110 (ii) 0001 (iii) 1010

- b Define NFA. What are the differences between DFA & NFA? 5M

**OR**

- 3 a Discuss Chomsky's Hierarchy of formal languages. 5M
- b Explain briefly about DFA and NFA. 5M

**UNIT-II**

- 4 a Construct an equivalent FA for the given regular expression  $(0+1)^*(00+11)(0+1)^*$ . 5M
- b Construct FA for the given RG: 5M

i)  $S \rightarrow aA/b$     ii)  $A \rightarrow 0B/1$

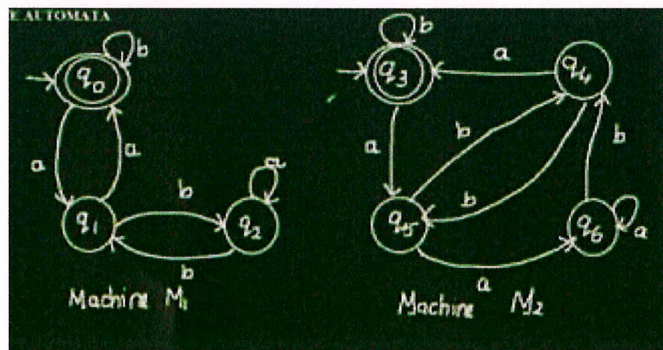
$A \rightarrow bB/a$      $B \rightarrow 1C/0$

$B \rightarrow c$      $C \rightarrow 0D/1$

5M

**OR**

- 5 a Write the process of equivalence two FA's? Find whether the equivalence two FA's or not.



5M

**b** Construct the Regular Grammar for the given Regular Expressions.

i)  $ab(a+b)$

ii)  $a^*(a+b)b^*$

5M

**UNIT-III**

**6 a** Define derivation tree? Construct Derivation tree, Leftmost and Rightmost derivation and Right most derivation for the string 11001010.

$S \rightarrow 1B/0A$

$A \rightarrow 1/1S/0AA$

$B \rightarrow 0/0S/1BB$

5M

**b** Construct CFG for the language consisting of palindromes of the string.

5M

**OR**

**7 a** Explain Left recursion and Left factoring.

6M

**b** Perform left factor from the grammar  $A \rightarrow abB/aB/cdg/cdeB/cdfB$ .

4M

**UNIT-IV**

**8 a** Define Instantaneous description (ID) in PDA.

6M

**b** Explain the graphical notation of PDA with one example.

4M

**OR**

**9 a** Explain Differences between DPDA and NPDA.

6M

**b** Construct an equivalent PDA for the following CFG:

$S \rightarrow aAB \mid bBA$

$A \rightarrow bS \mid a$

$B \rightarrow aS \mid b$ .

4M

**UNIT-V**

**10 a** Design a multi head Turing Machine for checking whether a binary string is a palindrome or not. Show the ID for 1001.

6M

**b** Differences between PCP and MPCP.

4M

**OR**

**11** Construct a Turing machine which recognizes the palindrome.

10M

\*\*\*END\*\*\*