Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular Examinations October-2022
FORMAL LANGUAGES AND AUTOMATA THEORY
(Common to CSE & CSIT)

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1	a	Define relations on sets and explain its properties with an example.	L1 6M
	b	Construct DFA for the given NFA	L6 6M

	Next state	
	0	1
→ q0	q0,q1	q0
q1	q2	q1
q2	q3	q3
(q3)	-	q2

OR

|			
2	a	Write why minimization of finite automata is required and explain the procedure adapted for minimization of finite automata in Table filling method.	L6 6M
	b	Convert the following Mealy machine into its equivalent Moore machine	L3 6M

Present State	I/P=0		I/P=1	
	Next State	O/P	Next State	O/P
→A	C	0	B	0
B	A	1	D	0
C	B	1	A	1
D	D	1	C	0

UNIT-II

3	a	Construct RE from given FA by using Arden's Theorem.	L6 6M
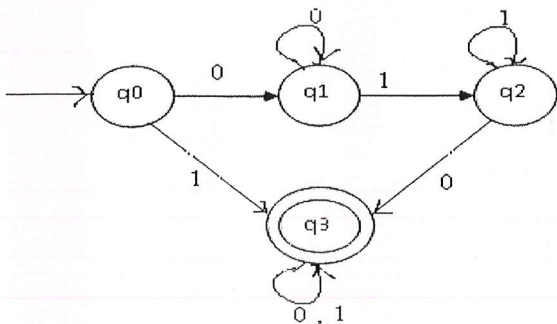
	b	Give the Closure properties of Regular Sets.	L1 6M

OR

4	a	Prove that L = $\{a^i b^i \mid i \geq 0\}$ is not regular	L3 6M
	b	Prove that the language L= $\{a^n b^n \mid n >= 1\}$ is not regular using pumping lemma.	L3 6M

UNIT-III

5   a   Perform left factor for the grammar A→abB/aB/cdg/cdeB/cdfB   L3   6M

     b   Construct Leftmost and Rightmost derivation and derivation tree for the string   L6   6M
0100110

S→0S/1AA

A→0/1A/0B

B→1/0BB

OR

6   a   Remove ε productons from the grammar   L3   6M

        S→ABaC   A→BC   B→b/ ε   C→D/ε   D→d

     b   Remove Left recursion from the grammar S→Sab/T   L6   6M

T→Tcd/F

F→Fa/G

UNIT-IV

7   a   Construct a PDA which recognizes all strings that contain equal number of 0's and   L6   6M
1's.

     b   Construct PDA from the following Grammar.   L6   6M

        S→ aB   B→ bA/b   A→ aB

OR

8   a   Explain about the graphical notation of PDA.   L5   6M

     b   Construct PDA from the following Grammar.   L6   6M

        S→ 0BB   B→ 0S /1S/0

UNIT-V

9   a   Explain the procedure adapted to convert RE to TM.   L2   6M

     b   Convert the given regular Expression (a+b)*(aa+bb)(a+b)* to TM   L3   6M

OR

10   a   Discriminate Universal Turing machine.   L5   6M

     b   Define PCP. Verify whether the following lists have a PCP solution.   L5   6M

$$\left(\frac{abab}{ababaaa}\right), \left(\frac{aaabbb}{bb}\right), \left(\frac{aab}{baab}\right), \left(\frac{ba}{baa}\right), \left(\frac{ab}{ba}\right), \left(\frac{aa}{a}\right).$$

*** END ***