VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test - I January 2023

Programme	: B.Tech (CSE) and its Specialization	Semester	: Winter Semester 2022-23
Course Code	: BCSE304L	Class Nbr(s)	: CH2022235001246
Course Title	: Theory of Computation		CH2022235001297
			CH2022235001296
			CH2022235001245
Faculty(s)	: Dr. Amutha S Dr. Prakash P Dr. Kiruthika S Dr. Karmel A	Slot	: B2+TB2
Time	: 90 Minutes	Max. Marks	: 50

Answer all the Questions

Q. No.	Sub-division	Question Text	Marks
1.		Given the language, $L=\{(a)^{3m}\,(bc)^{2n}\,(d)^{2p+2} \mid m\geq 1, n\geq 0, p>0\}$. Design a Finite Automaton M to recognize the language L	10
2.		Construct an equivalent deterministic finite automaton for the automaton, $M = (\{1,2,3,4,5,6,7\}, \{x,y,z\} \cup \varepsilon, \delta, \{1\}, \{7\})$ given in Fig. 1. Fig. 1	10
3.		Construct the finite automaton for the language L, where $L(R) = L(R_1) \cup L(R_2)$ $R_1 = a^*\,(aa + bb)^*$ $R_2 = a^+\,(a+b)^*\,c^*$	10
4.	a.	Design a deterministic finite automaton for the languages given below. $L_1 = \{ w \in \{a,b\}^* \mid w \text{ starts with ab but does not end with ab} \}$	5

	b.				
		$L_2 = \{w \in \{0,1\}^* \mid$ every even position of w is a 0$\}$.			5

5.		Construct the minimized DFA for the following finite automaton M = ({q_0, q_1, q_2, q_3, q_4, q_5), {a,b}, δ, {q_0}, {q_2,q_3,q_4,q_5})			10

δ	a	b
$\rightarrow q_0$	q_1	q_2
q_1	q_0	q_3
$*q_2$	q_4	q_5
$*q_3$	q_4	q_5
$*q_4$	q_4	q_5
$*q_5$	q_5	q_5

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