VIT

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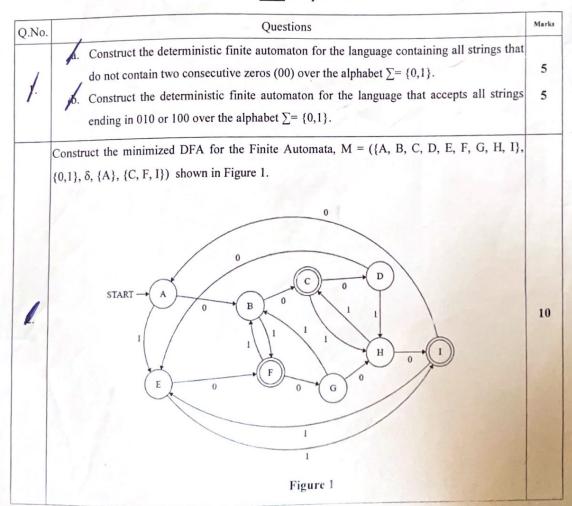(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test I – January 2023

Programme	: B.Tech CSE	Semester	:	WS 2022-23
Course	: Theory of Computation	Code	:	BCSE304L
		Slot	:	D2+TD2
Faculty	: Dr. R Jothi	Class Nbr	:	CH2022235000706
	Dr. Anita X			CH2022235000707
	Dr. Sureshkumar WI			CH2022235000710
	Dr. Smrithy G S			CH2022235000712
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Time	: 90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q.No.	Questions	Marks
1.	a. Construct the deterministic finite automaton for the language containing all strings that do not contain two consecutive zeros (00) over the alphabet $\Sigma = \{0,1\}$.	5
	b. Construct the deterministic finite automaton for the language that accepts all strings ending in 010 or 100 over the alphabet $\Sigma = \{0,1\}$.	5
2.	Construct the minimized DFA for the Finite Automata, M = ({A, B, C, D, E, F, G, H, I}, {0,1}, δ, {A}, {C, F, I}) shown in Figure 1. Figure 1	10

3.	Construct an equivalent Deterministic Finite Automaton for the regular expression, $(11\,\|\,0)^{*}\,(00\,\|\,1)^{*}\,01$	10
4.	Consider the language, $L = \{a^{2i+1}\,b^{j}\,c^{k+2}\ \|\ i \geq 0,\ j > 0,\ k \geq 0\}$ a. Give the regular expression that generates all strings in L.	2
	b. Convert the regular expression obtained in (4a) into a non-deterministic finite automaton with Null moves.	3
	c. Convert the non-deterministic finite automaton with Null moves obtained in (4b) into a non-deterministic finite automaton without Null moves.	5
5.	Construct the finite automaton for the language L, where $L = L_1 \| L_2$ $L_1 = \{w \ \| \ w \ \Sigma \ \{a,b\}^{*}$ contains strings where the string length is divisible by 4$\}$ $L_2 = \{w \ \| \ w \ \Sigma \ \{a,b\}^{*}$ contains the strings that has the third symbol from left as 'a' and the third symbol from the right as 'b'$\}$	10

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