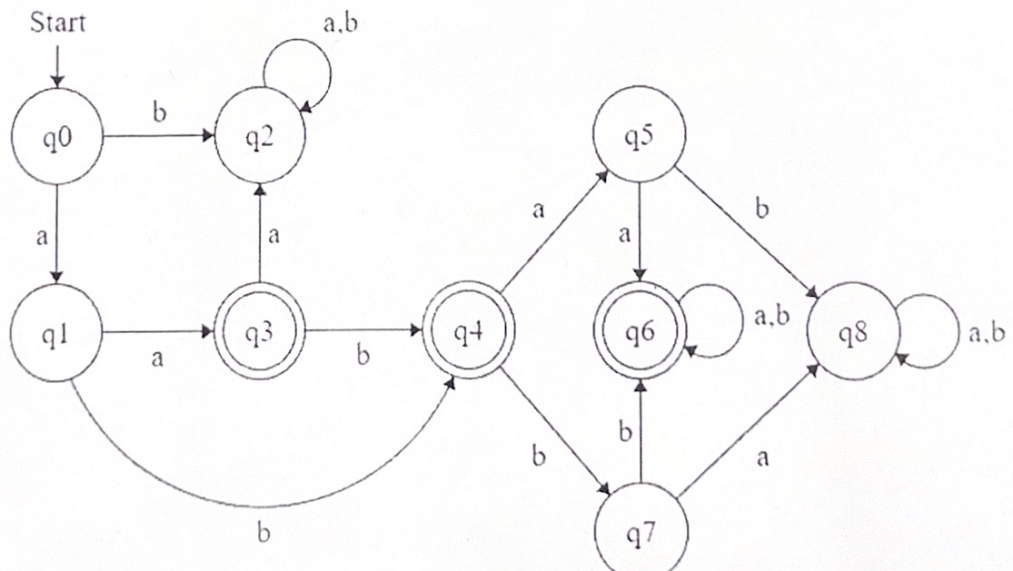# VIT

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

Continuous Assessment Test I – September 2023

Programme	: B.Tech CSE	Semester	:	FALL 2023-24
Course	: Theory of Computation	Code	:	BCSE304L
		Slot	:	F1+TF1
Faculty	: Dr. S. Suseela	Class Nbr	:	CH2023240101110
	Dr. K. Sathyarajasekaran			CH2023240101108
Time	: 90 Minutes	Max. Marks	:	50

Answer ALL the questions

Q. No.	Questions	Marks
1.	a) Construct the DFA for the language over $\Sigma = \{0,1,2\}$ for all strings in which the number of ones is divisible by 5. [5M] b) Construct the NFA for the language, L= $\{a^{3i} b^{2j} c^{2+k} \mid i, j, k \geq 0\}$ [5M]	10
2.	Justify the given machine is DFA and construct a minimized DFA for the same. 	10
3.	L= $\{a^{2+i} b^{2j} c^{2k+1} \mid i \geq 0, j > 0, k \geq 0\}$ a) Convert the given language L into a regular expression. [2M] b) Convert the generated regular expression into a NFA with Null moves. [3M] c) Convert the generated Null NFA into a NFA without Null moves. [5M]	10

4.	Construct the finite automaton for the language L, where L = {L₁ | L₂} L_1 = {w | w $\sum$ {0,1}* contains strings where string starts with 00 and ends with 11} L_2 = {w | w is a multiple of '4' when interpreted as a binary integer}	10

5.	In a school library, the librarian instructs the books to be arranged in the following order.
	    a) Either magazines or newspapers should be arranged first
	    b) Three types of language books in any order but not in mixed fashion.
	    c) The last two books should be encyclopaedia or dictionary.
	Design minimized automata to check whether the books arranged follow the pattern or not.
		10

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