VIT®

Vellore Institute of Technology

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

School of Computer Science and Engineering

Winter Semester 2022-2023

Continuous Assessment Test – 1

SLOT: D1+TD1

Programme Name &Branch: B. Tech. Computer Science & Engineering

Course Name & code: Theory of Computation & BCSE304L

Class Number (s): VL2022230502923, 4179, 2925, 2942, 2937, 2920, 4180, 2927, 2918, 2945, 2929

Faculty Name (s): Prof. Gunavathi C, Prof. Arup Ghosh, Prof. Sathiya Kumar C , Prof. Manikandan G , Prof. Saritha Murali , Prof. Prabakaran N, Prof. Jyothimon, Prof. Madiajagan M, Prof. Shalini L , Prof. Somasundaram S K, Prof. Rajarajan G.

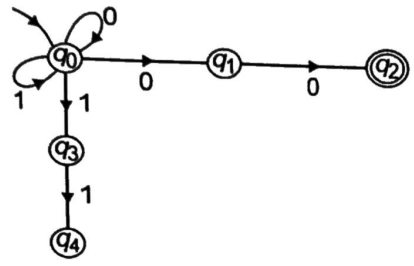
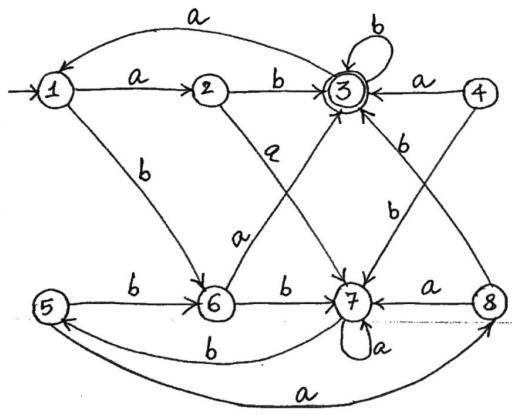
Exam Duration: 90 Min. **Maximum Marks: 50**

General instruction(s): Step by Step process is mandatory for all answers

Q. No.	Question	Max Marks
1.	a) Prove that for every integer **n >= 0**, the number $4^{2n+1} + 3^{n+2}$ is a multiple of 13 using mathematical induction Method? **(5 Marks)** b) Generate any three strings for the given grammars and also what is the language generated by the below given grammars: (i) Grammar Rules are: A→ aSb, S→aBb, B→aCb, C→ bC, C→b | null **(1.5 Marks)** (ii) Grammar Rules are: S→AB, A→Aa, B→Bb, A→ a, B→b **(1.5 Marks)** (iii) Give the Parse Tree for the three strings mentioned for the above given grammar **(2 Mark)**	10
2.	Convert the following NFA-Epsilon Transition Table into its equivalent NFA?(Note:- Detailed steps required)	10

δ	0	1
q_0	q_0, q_1	q_0, q_2
q_1	q_3	∅
q_2	∅	q_3
q_3	q_3	q_3

P.T.O

3.	a) Construct a deterministic finite automaton for the language accepting strings such that each '0' is immediately preceded and followed by '1' over input alphabet $\Sigma = \{0, 1\}$? b) Construct an NFA which accepts binary strings, which have at least a pair of 00 (or) a pair of 11?	(5+5)
4.	Convert the given Non-Deterministic Finite Automaton to its equivalent Deterministic Finite Automaton:  	10
5.	Minimize the given Deterministic Finite Automaton using Myhill Nerode Theorem Method (Table Filling Method)?  	10