VIT
Vellore Institute of Technology
CHENNAI

Continuous Assessment Test (CAT) – I   January 2025

Programme	:	5 year Integrated M.Tech Software Engineering	Semester	:	WINTER 24-25
Course Code & Course Title	:	ISWE203L Theory of Computation	Class Number	:	CH2024250502404 CH2024250502403
Faculty	:	Dr. B V A N S S Prabhakar Rao Dr. Prakash P	Slot	:	C1+TC1+TCC1
Duration	:	90 MINUTES	Max. Mark		50

General Instructions:
- Write only your registration number on the question paper in the box provided and do not write other information.

Answer all questions

Q. No	Sub Sec.	Description	Marks
1.		Consider the language L_1 = {hello, vit} and the language L_2 = {world, cse}. *Identify the set of strings* which are accepted by the following languages L_3 and L_4. i. $L_3 = L_1^* L_2^*$ ii. $L_4 = (L_2 L_1)^*$	05
2.		Construct a *Deterministic Finite Automata (DFA)* over Σ={a,b} that accepts all strings containing **no more than two consecutive** occurrences of the same input letter. For instance, abba should be accepted but not abaaab.	10
3.		In certain programming languages, comments appear between delimiters such as /# and #/. Let C be the language of *all valid delimited comment strings*. Such a string in C must begin with /# and end with #/ but have no intervening #/. For simplicity, assume the alphabet Σ = {a, b, /, #}. Give an **NFA** that recognizes language C.	10
4.		Convert the given Non-Deterministic Finite Automata (NFA) into *Deterministic Finite Automata (DFA)*. 	10

5.		Construct an equivalent *Deterministic Finite Automata (DFA)* for the following Finite automata with a *minimum number of states*.	10
6.	a	Write the regular expression for the language $L = \{w : w \text{ contains at least two 0's and at most one 1 } \}$ (2 Marks)	05
	b	Construct an *equivalent finite automata* for the expression given below. (3 Marks) i. $(ab)^* (ab^+)$	

**********All the best *************