Hall Ticket Number :										

R-15

Code: 5G143

II B.Tech. II Semester Supplementary Examinations April 2023

Formal Languages and Automata Theory

(Computer Science and Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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			Marks	CO	BL
		UNIT–I			
1.	a)	Define Alphabets, Strings and Languages with examples?	6M	CO1	L1
	b)	Construct DFA equivalent to the following NFA. Show the acceptance of the string 00011 on both the Fas. Assume that q0 is the start state and q3 is final state?			

	0	1
q0	{q0,q1}	{q0}
q1	-	{q2}
q2	-	{q3}
q3	-	-

10M CO1 L5

OR

2.	a)	Compare and contrast Moore Machine with Melay Machine?	5M	CO1	L5
	b)	Design a DFA that accepts the language over the alphabet, Σ = {0, 1, 2} where the decimal equivalent of the language is divisible by 3**?**	9M	CO1	L6
		UNIT–II			
3.	a)	Explain the closure properties of regular languages?	6M	CO2	L2
	b)	Construct a Finite Automata for the regular expression? (0+1)(1+10)*	8M	CO2	L5
		OR			
4.	a)	Define a Regular expression. Find regular expressions for the following languages over the alphabet {a, b**}.**			
		i. All strings of odd length			L1
		ii. All strings that end with either ab or b			
		iii. All strings that contain even number of a's	8M	CO2	L5
	b)	Show that the Language L = $\{a^{i^2} / i \geq 1\}$ is not regular?	6M	CO2	L6
		UNIT–III			
5.	a)	List the closure properties of Context Free Languages?	6M	CO3	L1

b) Explain minimization of CFG with the following example?

$S \rightarrow aA \mid aBB$

$A \rightarrow aAA \mid \epsilon$

$B \rightarrow bB \mid bbC$

$C \rightarrow B$ 8M CO3 L2

OR

6. a) Construct a FA recognizing the following regular grammar?

$S \rightarrow aS/bA/b$

$A \rightarrow aA/bS/a$ 6M CO3 L5

b) Convert the given CFG to CNF?

$S \rightarrow aAs/\ a$

$A \rightarrow SbA/SS/ba$ 8M CO3 L6

UNIT–IV

7. a) Write and explain about Push Down Automata? 4M CO4 L1

b) Construct a PDA that accepts the language $L=\{wcw^R/w \in \{a, b\}\}$? 10M CO4 L5

OR

8. a) Describe equivalence of CFL and PDA with appropriate example? 6M CO4 L2

b) Design PDA to accept the following CFG?

$S \rightarrow AA/a$

$A \rightarrow SA/b$ 8M CO4 L6

UNIT–V

9. a) Write short notes on Liner Bounded Automaton? 4M CO5 L4

b) Design Turing's Machine to accept the language $L=\{a^n\ b^n\ c^n\ / n\geq 1\}$. Also give the graphical representation and Instantaneous description (ID) for the import "aabbcc"? 10M CO5 L6

OR

10. a) Write and explain about Counter machines? 6M CO5 L2

b) Design a TM for $L = \{0^n1^n \mid n\geq 1\}$ 8M CO5 L6

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