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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech II Semester Supplementary Examinations, June 2024
Formal Language and Automata Theory
(CSE & CSE-AIML)

Roll No									

Time: 3 hours   **Max. Marks: 70**
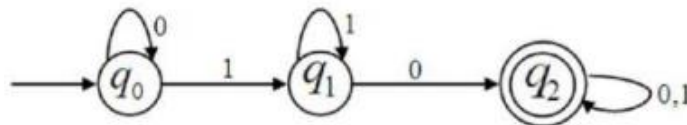
Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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			BCLL	**CO(s)**	**Marks**
		SECTION-I			
1	**A**	Design DFA for the following over {a, b}	**L3**	**CO-I**	**[7M]**
		i) All strings containing not more than three a's.			
		ii) All strings that has at least two occurrences of b between any two occurrences of a.			
	B	Explain about central concepts of Automata Theory.	**L2**	**CO-I**	**[7M]**
		OR			
2		Construct the Moore machine to determine residue mod 3 and convert into Mealy machine.	**L3**	**CO-I**	**[14M]**
		SECTION-II			
3	**A**	Convert regular expression (01* +1) to finite automata.	**L3**	**CO-II**	**[7M]**
	B	Explain about Pumping Lemma.	**L2**	**CO-II**	**[7M]**
		OR			
4	**A**	Explain the applications of regular expressions	**L2**	**CO-II**	**[7M]**
	B	Construct the regular expression corresponding to the language accepted by following DFA.	**L3**	**CO-II**	**[7M]**

			BCLL	**CO(s)**	**Marks**
		SECTION-III			
5	**A**	Explain the followings with examples.	**L2**	**CO-III**	**[7M]**
		i. Context free grammars			
		ii. Ambiguity in Grammars.			
	B	The following generates prefix expression with operands x,y and operators +,- and *.	**L3**	**CO-III**	**[7M]**

E→ **+ EE| * EE | - EE | x | y**
    i.   Find leftmost and right most derivations and a derivation tree for the string **+*-xyxy**.
    ii. Prove that this grammar is unambiguous.

OR

			BCLL	**CO(s)**	**Marks**
6	**A**	Discuss in detail about leftmost and right most derivation tree with example.	**L2**	**CO-III**	**[7M]**
	B	List and Explain application of context-free grammars.	**L4**	**CO-III**	**[7M]**

SECTION-IV

7	A	How to remove the ambiguity from the grammar? Explain with example.	L3	CO-IV	[7M]
	B	Construct CFG without ε – production from the one which is given below S → a | Ab | aBa A → b | ε B → b | A	L3	CO-IV	[7M]

OR

8	A	Define Chomsky Normal Form (CNF). Convert the following grammar to CNF S→0S0|1S1| ∈	L3	CO-IV	[7M]
	B	Construct PDA from the following CFG S → aAA A → aS|bS|a	L3	CO-IV	[7M]

SECTION-V

9	A	Design a Turing Machine to accept L={WCW^R | W is in (a+b)*}.	L3	CO-V	[7M]
	B	Write the properties of recursive and non-recursive enumerable languages.	L2	CO-V	[7M]

OR

10	A	Define post`s correspondence problem and show that it is undecidable.	L1	CO-V	[7M]
	B	Discuss in detail about P and NP problems.	L2	CO-V	[7M]

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