Course Code: 1950519 **Roll No:** **MLRS- R19** 19/12/22 (AN)

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

III B.Tech I Sem Supply End Examination, December 2022

Formal Languages and Automata Theory

(CSE & IT)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

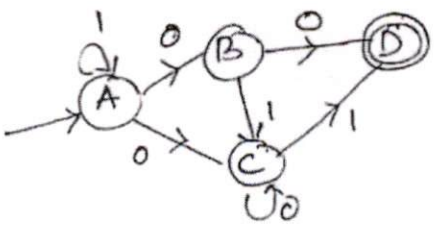
(10*2 Marks = 20 Marks)

1.	a)	Define NFA with epsilon moves	2M	CO1	BL1
	b)	Differentiate Mealy and Moore machine	2M	CO1	BL2
	c)	List all string up to length 4 for the regular expression **01^*01^***	2M	CO2	BL1
	d)	Define pumping lemma for regular languages	2M	CO2	BL1
	e)	Develop CFG for the language L = $\{a^n b^n \mid n>=1\}$	2M	CO3	BL3
	f)	Define ambiguous context free grammar	2M	CO3	BL1
	g)	Remove ϵ-productions from the grammar S→ aSa | bSb | ϵ	2M	CO4	BL3
	h)	Define Greibach Normal Form	2M	CO4	BL1
	i)	Write about halting problem of Turing machine	2M	CO5	BL2
	j)	Define recursive language.	2M	CO5	BL1

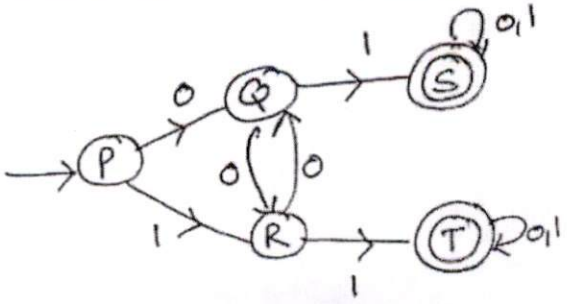
PART- B

(10*5 Marks = 50 Marks)

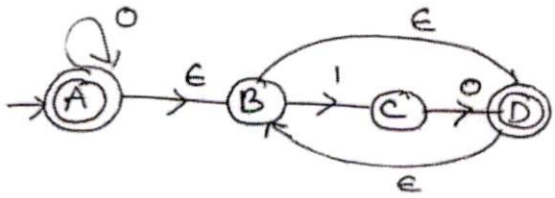
2	a)	Convert the following NFA to DFA	5M	CO1	BL3



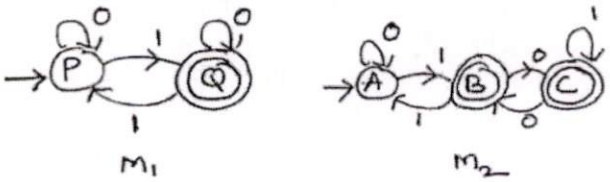
	b)	Minimize the following DFA and draw the minimized DFA	5M	CO1	BL3



3	a)	Compute equivalent deterministic finite automata for the following NFA with epsilon moves.	5M	CO1	BL3



	b)	Design DFA for the language all strings over the alphabet {a,b} which are ending with **aa**	5M	CO1	BL3
4	a)	Consider the following regular expression **0*11(01+1)***. Convert it to it's equivalent finite automata	5M	CO2	BL3
	b)	List and explain properties of regular languages	5M	CO2	BL2
		OR			
5	a)	Apply equivalence of two DFAs algorithm to check whether the following DFA's M1 and M2 are equivalent or not	5M	CO2	BL3



	b)	Show that the language L = {$0^n 1^n$ | n>=1} is not regular language.	5M	CO2	BL3
6	a)	Design PDA for the language L = {a^n c b^n | n>=1}	5M	CO3	BL3
	b)	Perform left most derivation, right most derivation and parse tree for the string **abab** by considering the grammar **S → aSbS | bSaS | ϵ** , whe S is the only variable in the grammar and {a,b} are terminals	5M	CO3	BL3
		OR			
7	a)	Design PDA for the language L = {wcw^R | ωϵ (a+b)*, ω^R is reverse of ω and **c** is special symbol.	5M	CO3	BL3
	b)	Discuss different methods to design push down automata	5M	CO3	BL2
8	a)	Convert the following CFG to it's equivalent Chomsky normal form **E → E + T | T** **T → T * F | F** **F → id** Where **V = { E, T, F }, T = { +, *, id }** and **E** is start variable	5M	CO4	BL3
	b)	Discuss closure properties of context free languages.	5M	CO4	BL2
		OR			
9	a)	Design Turing Machine for the language L = ***{$a^n b^n c^n$ / n ≥ 1}***	5M	CO4	BL3
	b)	Construct Greibach Normal Form for the grammar S→aA | bB | ϵ, A→a, B→b	5M	CO4	BL3
10	a)	List and explain the properties of recursively enumerable languages	5M	CO5	BL2
	b)	What is PCP? Give an example for it	5M	CO5	BL2
		OR			
11	a)	What is decidability? List few decidable and un decidable problems	5M	CO5	BL2
	b)	Briefly discuss about counter machines	5M	CO5	BL2

---oo0oo---