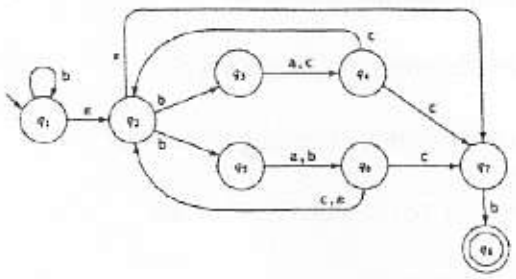
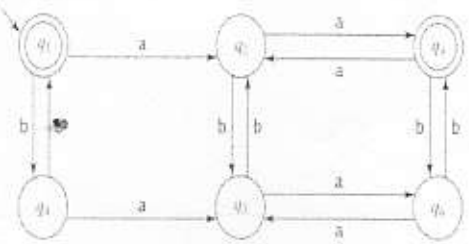
CONTINUOUS INTERNAL EVALUATION- 1

Dept: CSE	Sem / Div: 5th A and B	Sub: Automata Theory and Computability	S Code: 18CS54
Date: 20/10/2020	Time: 2:30 - 4:00 PM	Max Marks: 50	Elective: N
Note: Answer any 2 full questions, choosing one full question from each part.			

QN		Questions	Marks	RBT	COs
		PART A			
1	a	Explain with example, i. Alphabet ii. Language iii. Functions on string	4	L2	CO1
	b	Define a Moore Machine and a Mealy Machine. Give an example for each.	5	L2	CO1
	c	Design a DFSM for the following languages. i. L = { w ∈ {a, b}*: where |w| mod 3 < |w| mod 2 }. Write configurations for "baabab" ii. L={w ∈ {a, b}*: w contains an odd number of a's and an odd number of b's}. Write the configurations for "aabbab"	8	L3	CO1
	d	Design a NDFSM for the following languages: i. L={ ab, abc}* ii. L={ abab^n | n>=0} or { aba^n |n>=0}	8	L3	CO1
		OR			
2	a	Discuss standard operations on Languages with example.	4	L2	CO1
	b	Briefly explain hierarchy of languages with a diagram.	5	L2	CO1
	c	For the following NDFSM, use ndfsmtodfsm to construct an equivalent DFSM. Begin by showing the value of eps(q) for each state q. 	8	L3	CO1
	d	Minimize the following DFSM. 	8	L3	CO1

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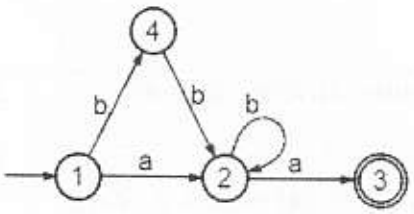
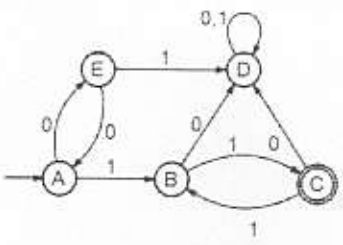
PART B

3	a	State and prove pumping theorem for regular language.	4	L2	CO2
	b	Convert the regular expression (0 ∪ 1)*1(0 ∪ 1) to FSM.	5	L3	CO2
	c	Write Regular expressions for the following languages: i. L = {w ∈ {a, b}* : w has both aa and bb as substrings}. ii. L = {w : |w| mod 3=0 where w ∈ (a, b)*} iii. L = {$a^n b^m$ | n>=4, m<=3 } iv. L= $L_1 - L_2$, where L_1 = a*b*c* and L_2 = c*b*a*	8	L3	CO2
	d	Convert the following FSM to a regular expression. 	8	L3	CO2
		OR			
4	a	Consider the regular grammar below. S → aT, T → bT | a | aW W → aW |ε Generate FSM and Obtain simplified Regular expression.	4	L3	CO2
	b	Prove that the language L= {$0^n 1^n$ | n ≥ 0} is not regular using pumping theorem.	5	L3	CO2
	c	Write Regular expressions for the following languages: i. L = {w ∈ {0, 1}* : w corresponds to the binary encoding, without leading 0's, of natural numbers that are evenly divisible by 4}. ii. L = {w ∈ {0, 1}* : every odd length string in L begins with 11}. iii. L = {w ∈ {0-9}* : w represents the decimal encoding of an odd natural number without leading 0's. iv. L= {w ∈ {a, b}* : w contains exactly two occurrences of the substring aa}.	8	L3	CO2
	d	Convert the following FSM to a regular expression. 	8	L3	CO2

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HOD 16/10/2020