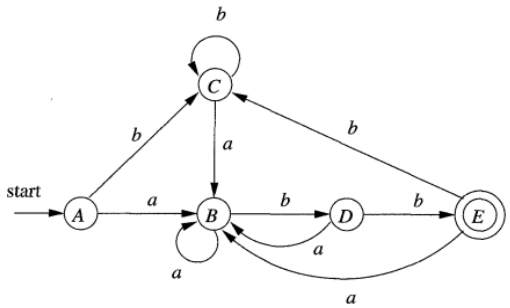
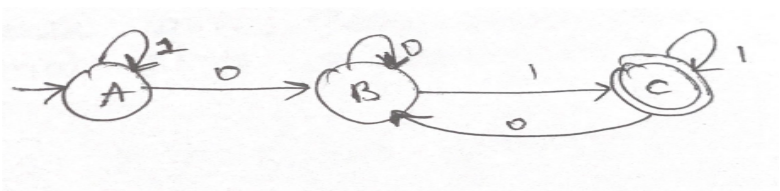
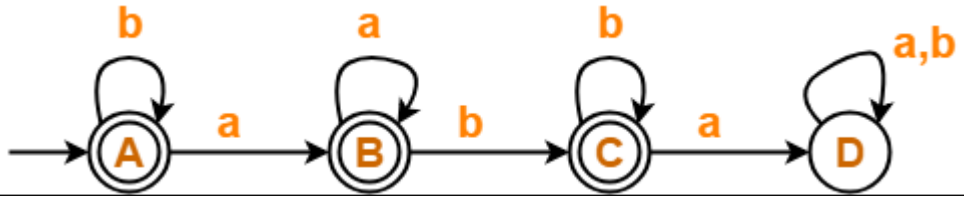
DEPARTMENT OF
INFORMATION SCIENCE & ENGINEERING

Date	6th July 2023	Maximum Marks	50
Course Code	21IS44	Duration	120 Min
Sem	IV Semester	CIE - I	
THEORY OF COMPUTATION			

Sl. No.	Questions	M	BT	CO
1.a	Define distinguishable and indistinguishable states. Identify and minimize the DFA (fig: 1.a) using table filling algorithm.  **Fig: 1.a**	07	L3	CO 2
1.b	List the steps involved in converting regular grammar into finite automata. Convert the following grammar using the same. S → 0A | 1B | 0 | 1 A → 0S | 1B | 1 B → 0A | 1S	03	L3	CO 2
2.a	Construct an ε-NFA for the following regular expressions: i) $(00+1)^*(10)^*$ where $\Sigma = \{0,1\}$ i) $(a^*+b^*+c^*)$ where $\Sigma = \{a, b\}$	05	L2	CO 2
2.b	Briefly explain the following: i) Applications of Regular Expressions. ii) Algebraic laws of Regular Expressions.	05	L2	CO 1
3.a	Define left linear grammar and produce the same for the given DFA:  	05	L1	CO 1
3.b	State Pumping Lemma for Regular Languages. By using Pumping Lemma,	05	L2	CO

	Prove that L = {ww^R | w $(0+1)^*$} is not regular.			1
4.a	Show that class of regular languages is closed under Intersection, homomorphism and Complementation.	04	L2	CO 1
4.b	Obtain Regular Expression for the given Finite Automata using State Elimination Method. 	06	L3	CO 2
5.a	Explain any two decision properties of regular languages with an example.	05	L2	CO 2
5.b	Write regular expressions for the following languages: Σ = {0,1} i) The set of all strings that contain exactly three 1's. ii) The set of even length strings. iii) The language of all strings containing exactly two 0's.	03	L2	CO 1
5.c	Draw NFA to recognize strings that start and end with same character for ∑ = {a,b}.	02	L2	CO 2

BT-Blooms Taxonomy, CO-Course Outcomes, M-Marks

Marks Distribution	Particulars		CO1	CO2	CO3	CO4	L1	L2	L3	L4	L5	L6
	Test	Max Marks	22	28	--	--	05	29	16	--	--	--

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