BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2023)

CLASS: BTECH **SEMESTER : V**
BRANCH: CSE/IT **SESSION : MO/2023**

SUBJECT: CS331 FORMAL LANGUAGES AND AUTOMATA THEORY

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Explain tuples of Finite Automata in short	[1]	2	4
Q.1(b)	For a Finite Automata the set of input symbol Σ = {a, b, c}. Design a minimal Deterministic finite Automata that will recognize strings containing even numbers of 'a' and 'b' but odd number of 'c'.	[4]	2	4
Q.2(a)	Σ = {a, b}. Design a Mealy machine that will produce: '0' for patterns "aba", "aab", "abb" and "aaa", '1' for patterns "bab", "bbb", "baa" and "bba" And will produce '2' otherwise. Note: overlapping of patterns is not allowed.	[3]	2	4
Q.2(b)	Convert the Mealy machine designed for problem 2(a) to corresponding Moore machine.	[2]	2	4
Q.3(a)	Design a DFA to recognize string over Σ = {a, b} that ends with "ab"	[2]	2	4
Q.3(b)	From the designed DFA for question 3.a, derive the corresponding regular expression	[3]	1,2	3
Q.4(a)	Write regular expression for strings where every 'a' will be followed by a 'b'	[2]	1,2	3
Q.4(b)	Convert the regular expression written for 4.a into corresponding DFA.	[3]	1,2	3
Q.5(a)	State and explain functioning of Pumping Lemma.	[2]	1	1
Q.5(b)	Using Pumping Lemma check the following language is regular or not. Σ = {a}, L = {a^i : i is a prime}	[3]	2	3

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