Code No: **PC3103** **R20**

III B. TECH I SEMESTER REGULAR EXAMINATION 2022-23
AUTOMATA THEORY AND COMPILER DESIGN
(Common to IT, CSO, AID, CSM)

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

Note: Answer **ONE** question from each unit **(5 × 14 = 70 Marks)**

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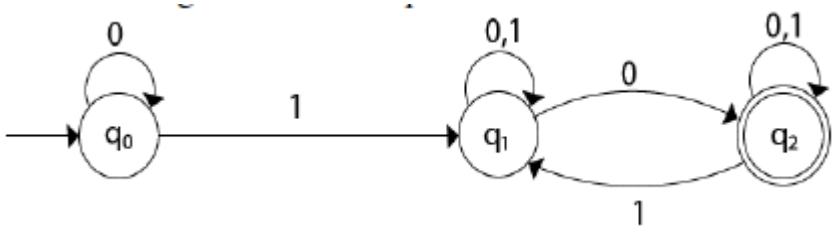
		UNIT-I	
1.	a)	Design a DFA to accept the language L = {w |w has both an even number of 0's and an even number of 1's}.Represent obtained DFA by transition table. Show the transitions of DFA for the string **110101.**	[7M]
	b)	Design a Moore and Mealy machines for 2's complement of binary number.	[7M]
		(OR)	
2.	a)	Convert the given NFA to equivalent DFA 	[7M]
	b)	What is NFA? Design a NFA for the following language L={0101^n where n>0}	[7M]
		UNIT-II	
3.	a)	What is regular expression? Write the regular expression for the following languages over {0, 1}* i) The set of all strings such that number of 0's is odd ii) The set of all strings that contain exactly three 1's iii) The set of all strings that do not contain 1101	[7M]
	b)	Consider the CFG with {S,A,B} as the non-terminal alphabet, {0,1} as the terminal alphabet, S as the start symbol and the following set of production rules S →A1B A →0A / ∈ B → 0B / 1B / ∈ For the string w = 00101, find the Leftmost derivation, Rightmost derivation, and Parse Tree.	[7M]
		(OR)	
4.	a)	Find equivalent grammar in CNF for S→bA|aB, A→bAA|aS|a, B→aBB|bS|b	[7M]
	b)	Construct a regular expression corresponding to the DFA represented by the below transition table. q_1 is both the initial state and final state.	[7M]

δ	0	1
q_1	q_1	q_2
q_2	q_3	q_2
q_3	q_1	q_2
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		UNIT-III	
5.	a)	Define PDA andinstantaneous description of PDA. Obtain a PDA to accept the language L= { wcw^R : w $\in${a,b}*}.Draw transition diagram of PDA. Show the moves by this PDA for string **abbcbba**	[7M]
	b)	Construct a Turing Machine for language L = {$0^n1^n/n\geq1$}. Specify its transition diagram and table. Process the string **0011** using ID notation.	[7M]
		(OR)	
6.	a)	Construct a PDA, M equivalent to the following CFG : S→0BB, B→0S/1S/0 Test whether 010^4 is in N(M)?	[7M]
	b)	Design Turing machine to accept all set of palindromes over {0, 1}*. And also write the transition diagram and Instantaneous description on the string 10101	[7M]
		UNIT-IV	
7.	a)	What are the different phases of compiler in synthesizing the target program? Explain with an example.	[7M]
	b)	What is left recursion and left factoring? Verify whether the following grammar is LL(1) or not? E →E + T | T T→ T* F / F F→(F) |a|b.	[7M]
		(OR)	
8.	a)	Draw the structure of LR parser. Construct SLR(1) Parser table for the given grammar S ->Aa| bAc| Bc| bBa A -> d B -> d	[7M]
	b)	Explain the following, i) Syntax Directed Translation ii) S-Attribute and L-Attribute	[7M]
		UNIT-V	
9.	a)	Write the quadruple, triple, indirect triple for the expression -(a*b) + (c+d)-(a+b+c+d)	[7M]
	b)	Explain the following, i) Peephole optimization techniques. ii) Code motion and frequency reduction	[7M]
10.	a)	What is the purpose of code optimization? Explain in detail loop optimization with example.	[7M]
	b)	Explain the following i) Common sub expression and dead code elimination. ii) Copy propagation, constant folding. iii) Strength Reduction	[7M]

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