

Roll No.

Total No. of Pages : 02

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B.Tech. (Information Technology) (Sem-5)
FORMAL LANGUAGE & AUTOMATA THEORY

Subject Code : BTIT-501-18

M.Code : 78256

Date of Examination : 17-11-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

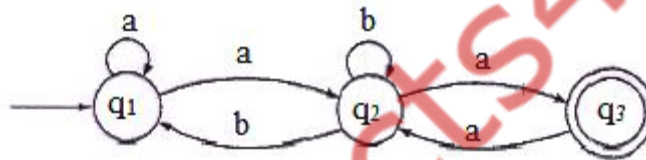
- (a) Define Finite Automaton
- (b) What are various properties of transition function?
- (c) Define grammar and language
- (d) Differentiate between left and right context in languages
- (e) Define yield and ambiguity in CFG
- (f) Cook-Levin Theorem
- (g) Define TM
- (h) Define the term acceptability in PDA
- (i) Give instantaneous description of turing machine
- (j) Differentiate between DFA and N DFA.

SECTION-B

2. Construct a Moore machine equivalent to the Mealy machine M defined by following table:

Present State	Next State			
	a=0		a=1	
	state	output	state	output
→ q ₁	q ₁	1	q ₂	0
q ₂	q ₄	1	q ₄	1
q ₃	q ₂	1	q ₃	1
q ₄	q ₃	0	q ₁	1

3. Prove that string represented by following transition system is $(a+ a(b+aa)^*b)^* a(b+aa)^*a$.



4. What are the different types of Grammars and Languages associated with it?
5. Explain the concept of ambiguity with the help of example.
6. Describe any two representation of TM.

SECTION-C

7. Design PDA for $\{a^m b^n \mid m > n\}$
8. Find a grammar in GNF equivalent to the grammar

$$E \rightarrow E + T \mid T \qquad T \rightarrow T * F \mid F \qquad F \rightarrow (E) \mid a$$

9. Write a note on Universal Turing Machines and Rice Theorem.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.