



**Term Evaluation Theory (Even) Semester Regular Examination February 2026**

Name of the Course: B. Tech  
Semester: IV

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Name of the Paper: Finite Automata and Formal Languages  
Paper Code: TCS-402  
Time: 1.5 hour

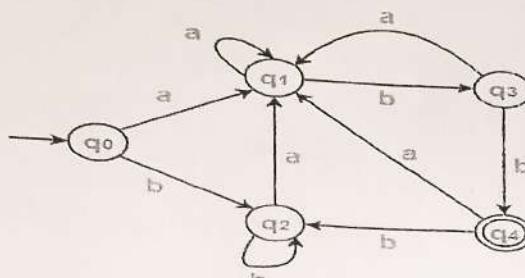
Maximum Marks: 50

**Note:**

- (i) Answer all the questions by choosing any one of the sub-questions
- (ii) Each question carries 10 marks.

**Q1.**

- a. Minimize the following DFA using Myhill-Nerode theorem. (10 Marks)

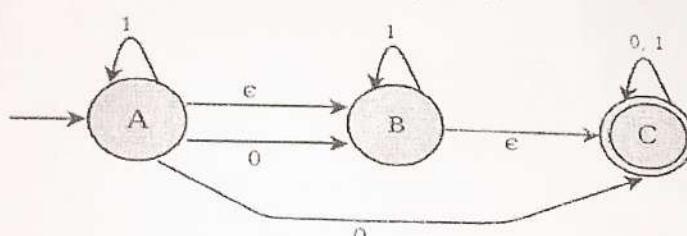


OR

- b. Design a NFA that accepts the strings having third last symbol from the last is 1, over input 0,  
1. Also convert the NFA into equivalent DFA.

**Q2.**

- a. Convert the following Epsilon-NFA to DFA. (10 Marks)



OR

- b. Obtain the grammar L(G) from language  $L = \{0^i 1^j \mid i = j, i, j \geq 0\}$ .

**Q3.**

(10 Marks)

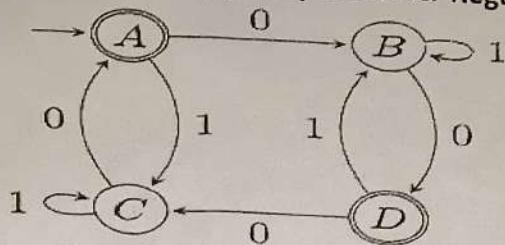
- a. Construct a moore machine that takes set of all strings over a, b as input and prints '1' as output for every occurrence of 'ab' as a substring. Also convert the Moore to equivalent Mealy machine.

OR

- b. Obtain the regular expression by using Arden's theorem for the below FA.



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Q4.

(10 Marks)

- a. Prove that regular grammars/languages are closed under intersection (by taking two finite automata's).

OR

- c. Prove that language  $L = \{ww, w \in \{0,1\}^*\}$  is not regular using pumping lemma.

Q5.

(10 Marks)

- a. Construct the FA from regular expression  $00^*(0^*+1)^* + 1^*1(0+1)^*$ .

OR

- b. Construct a DFA that accept strings of even number of a's and odd number of b's.