

Theory of Automata (CS301)

Sessional-I Exam

Date: September 20, 2025

Course Instructor(s)

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Total Time (Hrs.): 1

Total Marks: 35

Total Questions: 2

Roll No

Section

Student Signature

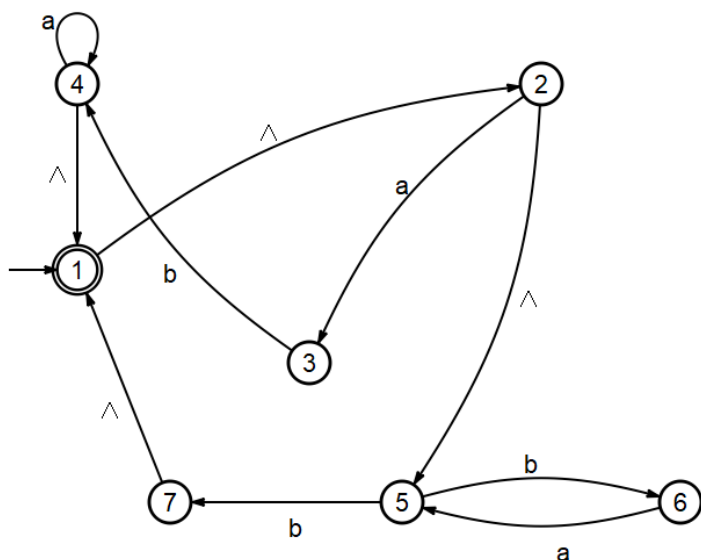
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Attempt all questions. Solve Question 1 and 2 on the answer sheet and record the final result in the space provided on the question paper. No marks without working.

CLO 2	CLO 2			
Question 1 (10)	Question 2 (5+10+10)			Total Marks (35)
	(a)	(b)	(c)	

CLO #: 2

Q1: Using the extended transition function for the given NFA- ϵ /NFA-NULL/NFA- \wedge , tell whether the string $abb \in L$ or not. Show full working on answer booklet. [10 Marks]



[Extended transition function for string abb starting with the state 1] =

$\delta^*(1, abb) =$
{ }

Accept /Reject

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CLO #: 2

Q2: Enumerate the following problem (give 10 accepting strings in canonical order). Also, give its regular expression and construct a Deterministic Finite Automaton (DFA) for the problem.
[10 Marks]

$\Sigma = \{S, 0, 1, A\}$.

Acceptable strings are defined as messages that must follow the structure (with three parts):

Message =

Start	Payload	End
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Rules:

1. The message must begin with S.
2. The payload consists of zero or more bits (0 or 1).
3. The message must end with symbol A.
4. The total number of 1's in the payload must be divisible by four.
5. The payload must not contain two consecutive 0's.

Solution:

a) Enumeration:

[5 marks]

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

b) Regular Expression:

[10 marks]

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c) DFA :

[10 marks]