

Student Name:
University Roll No.:

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School of Engineering
First Theory Sessional Examination
Odd Semester (AS: 2024-25)
B. Tech: CSE (All Sections) [Year: III]
Course Title: AUTOMATA THEORY AND FORMAL LANGUAGE
Course Code: BCS-3504
[Semester : VI]
Max Marks: 30
Time: 1hr5

SECTION 'A'

Q.N.1. Attempt all parts of the following:

	Course Objective	Marks
a) Define string.	CO 1	1
b) Explain Finite Automata.	CO 1	1
c) Differentiate between DFA and NFA.	CO 1	1
d) Explain Kleene's closure and Positive closure.	CO 1	1
e) Design a regular expression that represent all string over the alphabet $\Sigma = \{a, b\}$, such that for every accepted string 2nd from right end is always b.	CO 2	1

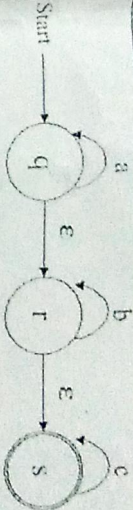
SECTION 'B'

Q.N.2. Attempt any two parts of the following:

	Course Objective	Marks
a) Construct DFA that all binary strings where the number of 0's is divisible by 3 and the number of 1's is divisible by 2.	CO 1	7.5
b) Construct an DFA equivalent to given NFA whose δ is given by- $\delta(q_1, 0) = \{q_2, q_3\}$, $\delta(q_1, 1) = \{q_1\}$, $\delta(q_2, 0) = \{q_1, q_2\}$, $\delta(q_2, 1) = \{q_3\}$ $\delta(q_3, 0) = \{q_2\}$, $\delta(q_3, 1) = \{q_1, q_2\}$	CO 1	7.5
c) Consider a DFA and convert it into regular expression using Arden's theorem. $\delta(A, a) = A$, $\delta(A, b) = B$, $\delta(B, a) = B$, $\delta(B, b) = B$ A is the initial state and B is the final state.	CO 2	7.5

SECTION 'C'

Q.N.3. Attempt any one parts of the following:

SECTION 'C'		Course Objective	Marks
Q.N.3. Attempt any one parts of the following:			
a)		CO 2	10
Convert the following NFA with ϵ moves to DFA without ϵ moves.			

Construct Minimum State Automata equivalent to given DFA?

Table 1: Mapping between COs and questions

COs	Questions Numbers	Total Marks
CO1	1.a, 1.b, 1.c, 1.d, 2.a, 2.b, 3.b, 3.c	39
CO2	1.c, 2.c, 3.a	18.5

28.10.2024