



## Mid Term (Odd) Semester Examination October 2024

Roll no.....

Name of the Course and semester: MCA IV

Name of the Paper: Theory of Computation and Compiler Construction

Paper Code: TMC 304

Time: 1.5 hour

Maximum Marks: 50

### Note:

- Answer all the questions by choosing any one of the sub questions
- Each question carries 10 marks.
- Please specify COs against each question.

Q1. (10 Marks)

a. What is Finite State Machines? Explain the various notations used during design of FA? (CO1)

OR

b. Obtain a DFA to accept strings of a's and b's

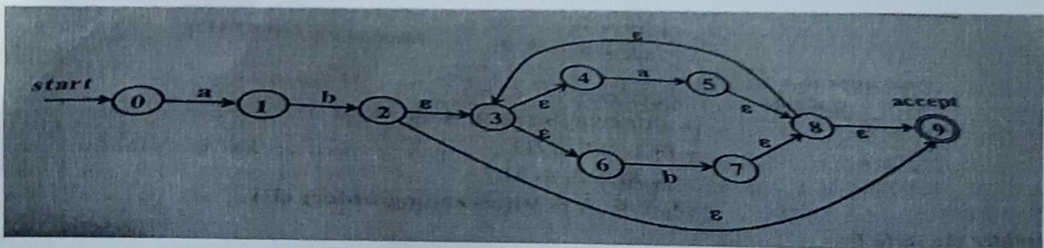
- Having even numbers of a's and odd number of b's.
- At most two consecutive b's.

Q2. (10 Marks)

a. Explain the following terms: alphabets, power of an alphabet, Kleene Closure, Kleene plus, strings.(CO1)

OR

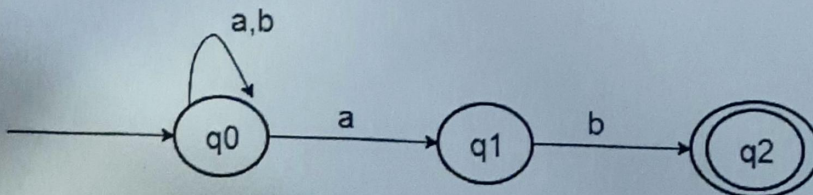
b. Convert the following  $\epsilon$ -NFA to its equivalent DFA.



Q3. (10 Marks)

a. Convert the following NFA to its equivalent DFA.

(CO1)







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OR

- b. Find the minimized DFA for the following:

$\delta$	0	1
$\rightarrow$ A	B	A
B	A	C
C	D	B
*D	D	A
E	D	F
F	G	E
G	F	G
H	G	D

Q4.

(10 Marks) (CO2)

- a. Define regular expression. Obtain regular expression for the language  $L = \{w \mid w \in \{0,1\}^* \text{ with at least three consecutive 0's.}\}$

OR

- b. Obtain a NFA for the regular expressions:

- $(a+b)^*aa(a+b)^*$
- $a^*+b^*+c^*0020$

Q5.

(10 Marks) (CO2)

- a. State and Prove Arden's Theorem.

OR

- b. Define Mealy and Moore machine. Construct a Mealy and Moore Machine which accepts strings of a's and b's and count the number of times the pattern "ab" is presented in the string.