H Roll No. 2294038

TCS–402

B. TECH. (CSE)

(FOURTH SEMESTER)

MID SEMESTER

EXAMINATION, March, 2024

FINITE AUTOMATA AND FORMAL LANGUAGES

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Design a minimal DFA to accept all strings in which every 'a' should never be followed by 'bb'. (CO1)

acceptable strings : abab, ab, ba

not acceptable : abb, babba

P. T. O.

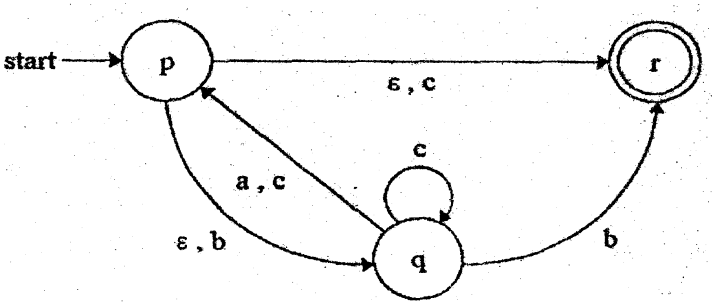
OR

(b) Construct a minimal DFA that accepts all the strings of a's and b's where length of string is divisible by 2 or 3. (CO1)

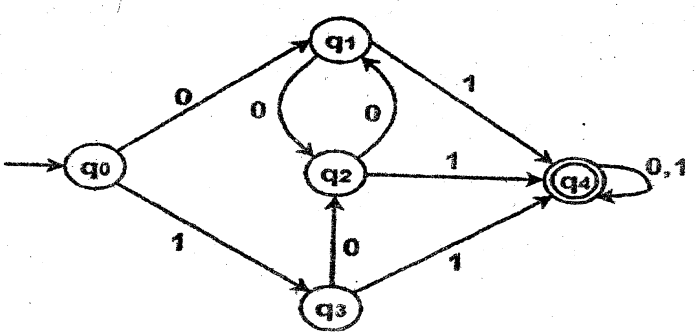
2. (a) Design a NFA for a language $L = (ab \cup aba)^*$ and convert the NFA to required DFA. (CO1)

OR

(b) Convert the ε-NFA to the NFA for given diagram : (CO1)



3. (a) Construct a minimum DFA equivalent to the DFA given in figure below : (CO1)



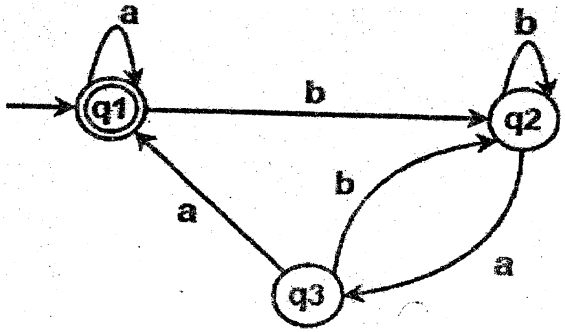
OR

(b) Show that $L = \{WW^R/W \in (a, b)^*\}$ is not regular. (CO1)

4. (a) Construct a DFA with reduced states equivalent to the regular expression $[ab + (b + aa)b^*a]$. (CO2)

OR

(b) Find the regular expression from the following automata using Arden's theorem : (CO2)



5. (a) Design a Moore machine for all the strings of 0's and 1's which when interpreted as decimal no.'s must be divisible by 2 and leaves output as 0 otherwise 1. (CO2)

OR

(b) Construct a Moore machine equivalent to the Mealy machine M defined in table below : (CO2)

Current State	Next State			
	0	Output	1	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