Roll No.

BENGALURU
School of Computer Science and Engineering & Information Science
Mid - Term Examinations - November 2024

Semester: V

Course Code: CSE2018

Course Name: Theory of Computation

Program: B. Tech

Date: 06-11-2024

Time: 09.30am to 11.00am

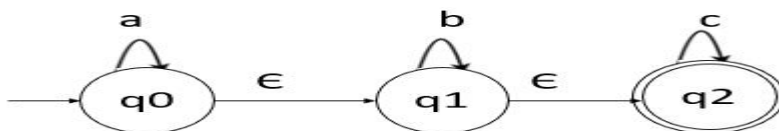**Max Marks**: 50

Weightage: 25%

Instructions:

(i) *Read all questions carefully and answer accordingly.*

(ii) *Do not write anything on the question paper other than roll number.*

Part A

Answer ALL the Questions. Each question carries 2marks.   **5Qx2M=10M**

| 1 | Define Finite Automata with an example. | 2 Marks | L1 | CO1 |

| 2 | Define Grammar with an example. | 2 Marks | L1 | CO1 |

| 3 | List any 4 applications of Finite Automata. | 2 Marks | L1 | CO1 |

| 4 | Find Epsilon closure of states q0, q1 and q2. | 2 Marks | L3 | CO2 |

| 5 | Construct the transition table for the following automata | 2 Marks | L3 | CO2 |
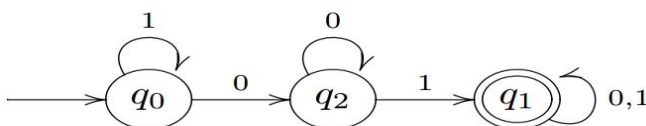
Part B

Answer ALL Questions. Each question carries 10 marks.   **4QX10M=40M**

6		Let L1= {a, ab, ba} and L2= {b, aa}, Find the following operations. 1. Concatenation of L1L2. 2. $L2^2$ 3. $L2^*$ 4. $L2^+$ 5. $L1^R$	10 Marks	L3	CO1

<center>**or**</center>

7	**7a.**	Explain in detail about 1. Pushdown Automata and its applications. 2. Turing Machines and its applications.	4 Marks	L2	CO1
	7b.	Discuss about operations on languages with examples.	6 Marks	L2	CO1

8	**8a.**	Construct DFA to accept the language contains even number of 0^s and even number of 1^s.	5 Marks	L3	CO2
	8b.	Construct NFA to accept the strings with a's and b's such that the string end with 'aa'.	5 Marks	L3	CO2

<center>**or**</center>

9	**9a.**	Construct NFA for a language L, which accept all the strings in which the third symbol from the right end is always a over the alphabet {a, b}.	5 Marks	L3	CO2
	9b.	Construct a DFA which accepts set of all binary strings divisible by 3.	5 Marks	L3	CO2

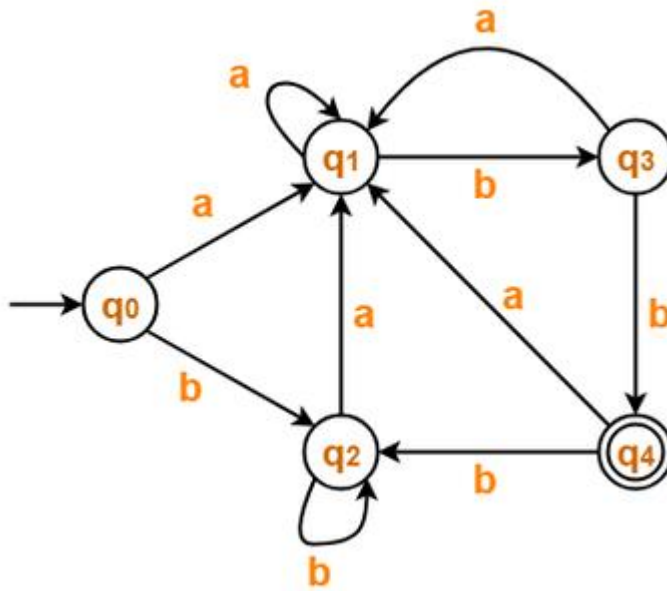|					
10	**10a.**	Construct the NFA for the following Regular expression (0+1)* (00+11)	5 Marks	L3	CO2
	10b.	Construct the NFA for the following Regular expression bc(ab+c)*	5 Marks	L3	CO2

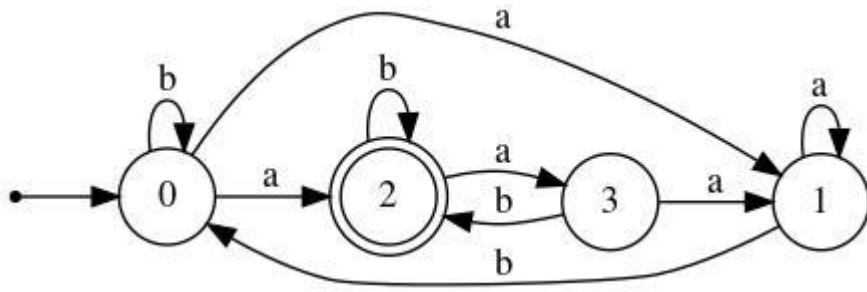**11** Find the Minimization of the following DFA   10   L3   CO2
                                                                          Marks

12 Convert the given NFA into DFA using subset construction method.   10   L3   CO2
                                                                          Marks

13 Convert the given NFA into DFA using subset construction method.   10   L3   CO2
                                                                          Marks