RollNo.

JSS MAHAVIDYAPEETHA
JSSACADEMYOFTECHNICALEDUCATION,NOIDA
DEPARTMENTOF INFORMATION TECHNOLOGY

CIA-I[EvenSemester-(AY2024-25]

Course : **B.Tech(IT/CSDS)**
Semester : **IVth**
Subject : **Theory of Automata and Formal Languages**
Time : **1 hrs=60min**

Date : **02/05/25**
SubjectCode : **BCS 402**
Max. Marks : **20**

	COURSEOUTCOMES	BL/KC*
CO1	**Design deterministic and nondeterministic automata and regular expressions for specified regular Languages.**	
CO2	**Convert among various notations for a regular language, such as DFAs, NFAs, and regular expressions.**	
CO3	Design grammar and PDA for CFL and state and prove their equivalence.	
CO4	Design TM to recognize language and compute functions.	
CO5	State and prove properties of regular, context free, recursive and recursive enumerable languages	
CO6	Explain the significance of the Universal Turing machine, Church-Turing thesis and concept of Undecidability.	

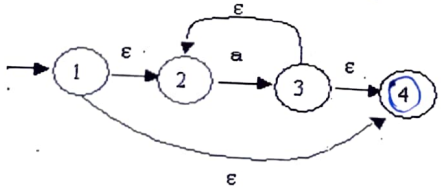
Section-A

Attemptallthequestionsofthissection **(1 X5=5)**

Q.No.		Question	Marks	CO	BL/KC*
1.	a	Differentiate Mealy and Moore machine in terms of input and corresponding output length with example.	1	CO1	BL1
	b	Differentiate between Kleen's closure and positive closure over the alphabet.	1	CO1	BL2
	c	How many numbers of states are required to accept any word of at most 3 lengths?	1	CO1	BL1
	d	What is the significance of epsilon transition in NFA?	1	CO2	BL2
	e	What are the applications of finite automata.	1	CO2	BL2

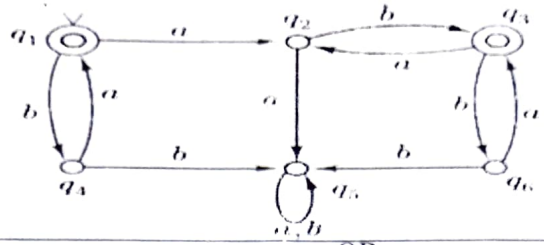
Section-B

Attempt all the questions of this section **(3X3=9)**

2.	Design a Finite Automata (FA) for the language: $L=\{(01)^i 1^{2j}$ **where i>=1,j>=1}**	3	CO1	BL3
	OR			
	Design a FA which accepts set of strings containing exactly four 1's in every string over alphabet ∑ = {0,1}			
3.	Convert the following epsilon NFA to DFA using the epsilon closure of state. ∑={a} 	3	CO1	BL3
	OR			
	Design a DFA for following language over the set ∑= {Decimal number digits 0,1,….,9} and L= { w| w MOD 3>1}			
4.	Explain the Myhill-Nerode Theorem?	3	CO2	BL2
	OR			
	Differentiate between DFA and NFA with diagram.			

Section-C

Attempt all the questionsof this section **(6X1=6)**

5.	Construct equivalent minimized DFA 	6	CO1	BL3
	OR			
	Convert following Moore Machine into Mealy Machine with minimized version			

PS	NS x=0	NS x=1	z
A	D	C	0
B	F	H	0
C	E	D	1
D	A	E	0
E	C	A	1
F	F	B	1
G	B	H	0
H	C	G	1