SRI KRISHNA INSTITUTE OF TECHNOLOGY

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Department of Computer Science and Engineering

Subject Name: Theory of Computation **Subject Code: BCS503**

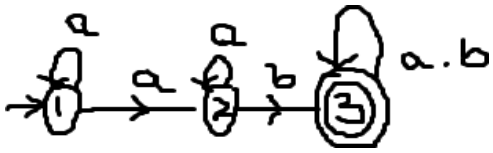
SEM: 5th

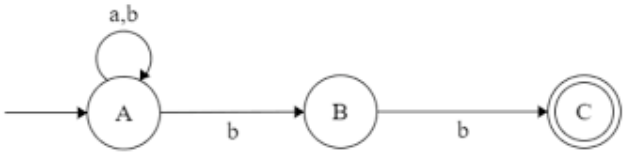
Faculty: Prof. Shweta S B

QUESTION BANK FOR MODULE-1

Sl. No		CO	RBT Level	Marks
1.	a) Define DFSM with suitable example. b) Explain the central concepts of automata theory. c) Model DFSM for the following languages on ∑ = {a,b}. i. Having exactly four a's. ii. Having at least four a's. iii. Having exactly four continuous a's. iv. Having at most four a's.	**CO1** **CO1** **CO3**	**L1** **L2** **L3**	**03M** **04M** **08M**
2.	a) Define regular language with example. b) Explain Chomsky hierarchy with neat diagram. c) Model NFSM for the following languages. i. L={w Ɛ{0,1} : w contains either 101 or 010} ii. L = {w Ɛ{a,b} : w contains at least one instance of aaba, bbb or ababa} iii. L = {a^n b a^m: n, m>=0}	**CO1** **CO1** **CO3**	**L1** **L2** **L3**	**03M** **04M** **08M**
3.	a) Define DFSM for the regular language L = {w ∈ {a, b}* : |w| is even}. b) Show that NFSM is equivalent to DFSM. c) Model Mealy machine that appends an odd parity bit after every four binary digits that it reads.	**CO1** **CO1** **CO3**	**L1** **L2** **L3**	**03M** **04M** **08M**
4.	a) Define the following functions on strings with example. i. Length ii. Concatenation iii. Kleen'sclosure b) Show the proof for Kleen's theorem part-II c) Build NFSM for the regular expressions. i.(aUb)*(aaUbb) ii.00(0U1)*11 iii.a* U b* U c* iv. (a*)*	**CO1** **CO1**	**L1** **L2**	**03M** **04M**

		CO3	**L3**	**08M**

5.	a) Define lexicographic order with suitable example. b) Explain applications of regular expressions. c) Consider NDFSM M as shown below. Construct an equivalent DFSM. And begin by showing values of eps(q) for each state q. δ_E | ε | a | b | c → * p | {r} | {p} | {q} | Φ * q | {r} | Φ | {q} | Φ * r | {r} | Φ | Φ | {r}	**CO1** **CO1** **CO3**	**L** **1** **L** **2** **L** **3**	**03M** **04M** **08M**
6.	a) Define Non deterministic FSM with suitable example. b) Demonstrate two applications of FSM with transition diagrams. c) Identify the regular expression from the given FSM using state elimination method. 	**CO1** **CO1** **CO3**	**L1** **L** **2** **L** **3**	**03M** **04M** **08M**
7.	1Design a DFA that accepts an even number of a's over the alphabet (a,b). Show that the string abaaba is accepted. 2 Design a DFA that accepts all the strings that begin and end with same symbol over the alphabet (0,1) Design a DFA that accepts the binary equivalent of string over (0,1) divisible by 3.	**CO1** **CO1**	**L** **2** **L** **2**	**05M** **05M**
8	Design an ε-NFA that accepts L={$a^n b^m$| n,m≥0} and convert into DFA. Construct an NFA for the following languages: i L={abc, abd, aacd} ii L={w|wЄ ababn , n≥0} iii L={w| length of w is even, w over (a,b)			
9	Define the following terms: i) String II) Language iii) Alphabet iv) length of the string v) Power of an alphabet	**CO1**	**L** **2**	**5**

10	Define DFA and design a DFA to accept the following language i)To accept the strings having even number of a's and b's ii) To accept the strings of a's and b's not having the substring aab	**CO1**	**L 3**	**10**
12	Define NFA. Convert the following NFA to DFA 	CO1	**L2**	**10 (2+8)**
13	Difference between DFA, NFA and €-NFA	CO1	**L1**	**5**

Faculty Signature