



SRI KRISHNA INSTITUTE OF TECHNOLOGY

(Approved by A.I.C.T.E. New Delhi, Recognized by Govt. of Karnataka, NAAC Accredited & Affiliated to V.T.U Belagavi)

No. 57, Chimney Hills, Hesaraghatta Main Road, Chikkabanavara Post, Bengaluru- 560090

Department of AIML

Subject Name: Theory of Computation

Faculty: Prof. B.Vidhya Banu

Subject Code: BCS503

SEM: 5th

QUESTION BANK FOR MODULE-2

1.	a) Define regular expression with an example. b) Show the FSM for $aU(bb)^*$ c) Construct Regular expressions to accept i. Strings of a's and b's such that fourth symbol from right is a and ends with b ii. Strings of a's and b's of any length. iii. Strings of 0's and 1's of odd length.	CO1 CO2 CO3	L1 L2 L3	3M 4M 8M
2.	a) Explain Kleen's theorem b) Show FSM for $(bUab)^*$ c) Construct FSM for the following regular expressions i. $(aa \cup bb)^*ab$ ii. $(a^*)^*$ iii. $(aUb)^*(aUbb)$ iv. $a^* \cup b^*$	CO1 CO2 CO3	L1 L2 L3	3M 4M 8M
3	a) Show the regular expression for $L=\{a^nb^m \mid n \geq 4, m \leq 3\}$ b) Explain the applications of Regular Expression. c) Construct Regular Grammar for the following languages. i. $L = \{w \in \{a,b\}^* : w \text{ ends with 'aaaa'}\}$ ii. $L = \{w \in \{a,b\}^* : w \text{ contains the substring 'abb'}\}$ iii. $L = \{w \in \{a,b\}^* : w \text{ is even}\}$	CO1 CO2 CO3	L1 L1 L3	3M 4M 8M
4.	a) Give regular expression for $L=\{a^{2n}b^{2m} \mid n \geq 0, m \leq 0\}$ b) Illustrate the procedure used for state elimination method. c) Write the applications of regular language with appropriate examples.	CO1 CO2 CO3	L1 L2 L3	3M 4M 8M



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5.	a) Show Regular Expression for strings of a's and b's of length 5. b) Find the language generated by given grammar $s \rightarrow as$ $s \rightarrow bs$ $s \rightarrow \epsilon$ c) Construct the regular expression for i. $L = \{a^n b^m \mid m+n \text{ is even}\}$ ii. $L = \{w \in \{a,b\}^* : w \text{ ends with 'aaaa'}\}$ iii. $L = \{w \in \{a,b\}^* : w \text{ contains the substring 'abb'}\}$ iv. $L = \{w \in \{a,b\}^* : w \text{ is even}\}$	CO1	L1	3M
		CO2	L2	4M
		CO3	L3	8M

6.	a) Define regular expression. b) Explain the closure properties of regular language. c) Obtain regular expression for given finite automata by state elimination method.	CO1	L1	3M
		CO2	L2	4M
		CO3	L3	8M

7.	a) Define regular grammar with an example. b) Show the FSM for $a^*b(aUb)^*$. c) Build regular language and expression for the given DFSA by state elimination method.	CO1	L1	3M
		CO2	L2	4M
		CO3	L3	8M

8	State and prove pumping lemma for regular languages and also prove the language $L = \{a^n b^n \mid n \geq 0\}$ is not a regular	CO2	L2	10
9	Convert the following automata to Regular Expression by using elimination method	CO2	L3	10



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	Fig. 2.4.4																														
10	Construct ϵ -NFA for the following Regular Expression $(0+11)0^*1$	CO2	L2	5																											
11	Minimize the following DFA by identifying distinguishable and non-distinguishable states <table><tr><td></td><td>a</td><td>b</td></tr><tr><td>->A</td><td>B</td><td>F</td></tr><tr><td>B</td><td>G</td><td>C</td></tr><tr><td>* C</td><td>A</td><td>C</td></tr><tr><td>D</td><td>C</td><td>G</td></tr><tr><td>E</td><td>H</td><td>F</td></tr><tr><td>F</td><td>C</td><td>G</td></tr><tr><td>G</td><td>G</td><td>H</td></tr><tr><td>H</td><td>G</td><td>C</td></tr></table>		a	b	->A	B	F	B	G	C	* C	A	C	D	C	G	E	H	F	F	C	G	G	G	H	H	G	C	CO3	L2	10
	a	b																													
->A	B	F																													
B	G	C																													
* C	A	C																													
D	C	G																													
E	H	F																													
F	C	G																													
G	G	H																													
H	G	C																													
12	Define Regular expression. Write the regular expression for the following languages: i) $L=\{a^n b^m n+m \text{ is even}\}$ ii) The set of all strings whose 3 rd symbol from right end is 0 iii) $L=\{a^{2n} b^{2m} n \geq 0, m \geq 0\}$	L2	10	2																											

Faculty Signature