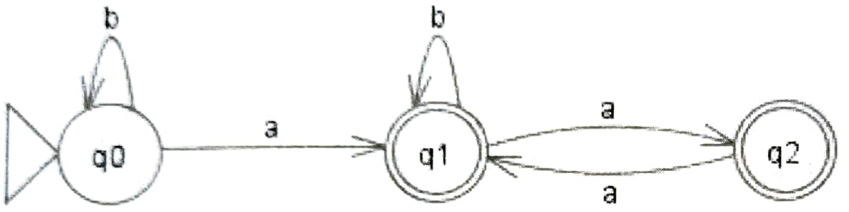
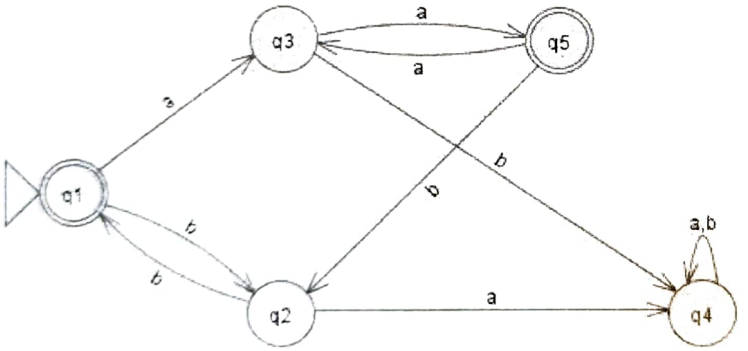
KONERU LAKSHMAIAH EDUCATION FOUNDATION
(Deemed to be University, Estd. u/s. 3 of UGC Act 1956)

B.Tech - Even Sem : Semester in Exam-I
Academic Year: 2022-2023

20CS3061AA - AUTOMATA THEORY AND FORMAL LANGUAGES

Set No: 2

Time: **Max.Marks: 50**

S.NO	Answer All Questions	Choice	Options	Marks	CO	CO BTL	COI BTL
1.	Define NFA formally. Given Σ = {a b}. Construct a ε-NFA that recognizes the language L = {a* + b*}	choice Q-2		4.5Marks	CO1	3	3
2.	Construct a minimal DFA, which accepts a set of all strings over {0, 1}, which when interpreted as a binary number is divisible by '3'.			4.5Marks	CO1	3	3
3.	Design a Finite Automata from the given RE [ab + (b + aa) b* a]	choice Q-4		8Marks	CO1	3	3
4	Write Arden's Theorem and prove it. Find the regular expression equivalent to the following transition diagram using this theorem: 			8Marks	CO1	3	3
5.	State the principle of Pumping Lemma. Write the steps to show that a given infinite language is not regular using a Pumping Lemma. Thus give the formal definition of the pumping lemma. Prove using the pumping lemma that the language L = {0^k 1^k: k∈N } is not regular.	choice Q-6		12.5Marks	CO1	3	3
6.	Define the equivalency of two FA. Construct a DFA that accepts the same language as the following one and has a minimum number of states. 			12.5Marks	CO1	3	3
7.	Construct right-linear and left-linear grammars for the language L ={a^nb^m: n≥2, m≥3}.	choice Q-8		4.5Marks	CO2	4	2
8.	Given a CFG given by G = (N, T, P, S) with N = {S}, T = {a, b}, P ={S->aSb, S->ab}. Obtain the derivation tree and the language generated L(G).			4.5Marks	CO2	4	2
9.	Write procedures to eliminate unit productions. Eliminate unit productions from the CFG with P given by: S->Aa|B, B->A|bb, A->a|bc|B.	choice Q-10		8Marks	CO2	4	2
10.	Verify whether a string "abbb" is a valid member of the following CFG in CNF: S->AB, A->BB|a, B->AB|b.			8Marks	CO2	4	2
11.	Define Chomsky Normal Form (CNF). Write a procedure to find equivalent grammar in CNF. Obtain a grammar in Chomsky Normal Form (CNF) equivalent to the grammar G with productions P given S ->aAbB, A ->aA| a, B ->bB |b.	choice Q-12		12.5Marks	CO2	4	4
12.	Define Greibach Normal Form (GNF). Convert the grammar S ->AB, A ->BS | b, B->SA|a into GNF.			12.5Marks	CO2	4	4

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