SRN										

PES University, Bangalore

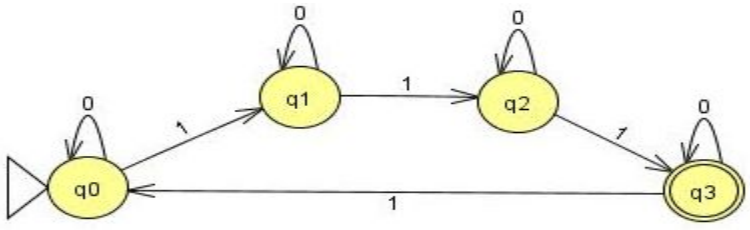
(Established under Karnataka Act No. 16 of 2013) **UE19CS205**

SAMPLE PAPER
FOR

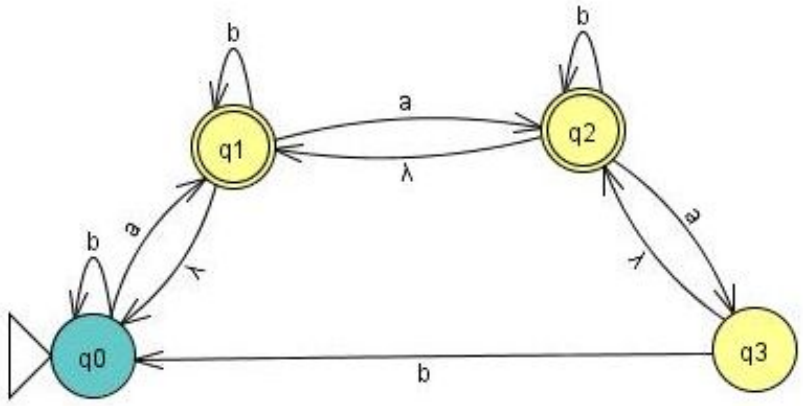
IN SEMESTER ASSESSMENT (ISA-1)- B.TECH III SEMESTER
October, 2020

Automata Formal Languages & Logic

Time: 2 Hrs **Answer All Questions** **Max Marks: 60**

1.	a)	Consider the function defined by the rule f(x)={2x+2 for 0<x<5}, specify the range and domain of the function.	2
	b)	Let L be the language , L={ w ∈ {a*} or w ∈{b}* , Σ {a,b}*} Construct a DFA that accepts all the strings that are in L and rejects all the strings that are not in L.	4
	c)	Answer the following: i) Consider the following DFA,  Give one sentence description of the above DFA ii) draw the transition diagram for the FA M={(A,B,C,D),(0,1), δ ,c,(A,C)} δ (A,0)=, δ (A,1)={A,B,C} δ (B,0)=B, δ (B,1)={A,C} δ (C,0)={B,C}, δ (C,1)={B,D} δ (D,0)={A,B,C,D} δ (D,1)={A}	2+2

SRN										

2	a)	Construct an NFA with six states that accepts the string over the alphabet {a,b} with either even number of a's or the number of b's is multiple of 3.	6
	b)	Convert the following NFA to DFA 	4
3.	a)	Give a regular expression that accepts a binary string whose decimal value is divisible by 3.	5
	b)	Explain the closure properties of regular languages.	5
4.	a)	Consider the following grammar: $S \rightarrow aSb$ $S \rightarrow aS$ $S \rightarrow \epsilon$ (a) Give a one-sentence description of the language generated by this grammar. (b) Show that this grammar is ambiguous by giving a string that can be parsed in two different ways. Draw both parse trees. (c) Give an unambiguous grammar that accepts the same language as the grammar above	6
	b)	Let the alphabet be {a, b} and the language be the set of strings with more a's than b's. Show that this language is not regular using Pumping Lemma for regular languages.	4

SRN										

5.	a)	Consider the following CFG S -> aAS|a A -> SbA | SS | ba Answer the following questions: i) What are the terminals, non-terminals and the start symbol of the grammar? ii) Draw parse tree for the following: "aabbaa" iii) Give leftmost derivation for the above string	6
	b)	Give equivalent grammar in CNF for the following CFG S -> aSbb | T T -> bTaa | S | λ	4
6.	a)	Give PDA for the following language: D = { $a^i b^j c^k$ | i, j, k ≥ 0, and i = j or j = k }	4
	b)	For the given grammar, check the acceptance of string w = 10010 using CYK Algorithm- S → XY | YZ X → YX | 0 Y → ZZ | 1 Z → XY | 0	6

Acknowledgement : The sample paper is prepared by Prof. Kavitha K N.