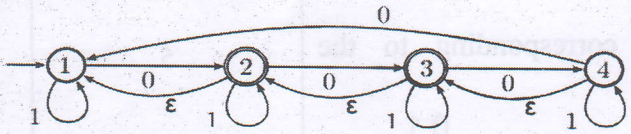
SOMAIYA VIDYAVIHAR UNIVERSITY

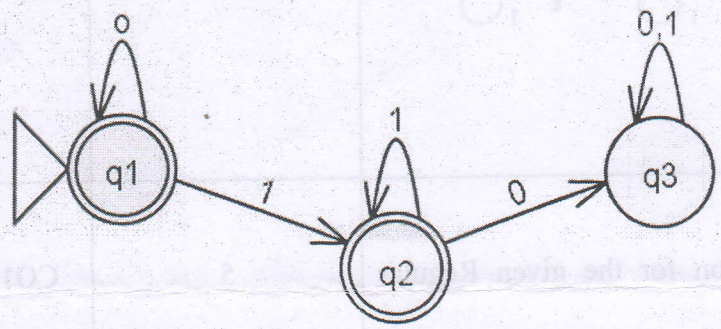
Semester: January 2023- May 2023		
Maximum Marks:30	**Examination: In-Semester Examination**	**Duration :1hr 15 min**
Programme code: 01 **Programme: Computer Engineering**	**Class:** SY	**Semester:** IV (SVU 2020)
Name of the Constituent College: **K. J. Somaiya College of Engineering**	**Name of the department:** COMP/ETRX/EXTC/IT/MECH	
Course Code: 116U01C404	**Name of the Course:** TACD	

Question No.		Max. Marks	CO	BT
Q1	Construct DFA for the language on {a,b} in which $n_a(w)$ mod 3==0 and $n_b(w)$ mod 3 ==1. Show the simulation of the Automata.	10 mark	CO1	AP
	OR	OR		
	Convert the given NFA with **ε moves** into NFA without **ε moves and then** DFA. (Final states = {2 and 3}) 	10 mark	CO1	AP
Q2	Attempt any two:			
	a) Construct NFA with epsilon for the given Regular Expression: **(0/ε) (10)*(ε/1)**	5	CO1	AP
	b) Construct Mealy Machine for generating the sum of previous and current bits of the input binary number. (hint: input - 0011 output - 00 01 10)	5	CO1	AP
	c) Prove that Regular languages are closed under Homomorphism and Closure.	5	CO1	UN

Q3	Attempt any two:			
	a) Construct a minimum state automaton equivalent to the finite automaton given below:	5	CO1	AP

Present State	Next State	
	0	1
→ qo	q1	q5
q1	q6	q2
*q2	q0	q2
q3	q2	q6
q4	q1	q5
q5	q2	q6
q6	q6	q4
q7	q6	q2

	b) Find a regular expression corresponding to the following FA.	5	CO1	AP



	c) Prove that the following language is not Regular.	5	CO1	EV

$$L=\{a^n b^{2n} c^n \mid n>=0\}$$