Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 5007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – MAY / JUNE 2024
Fifth Semester
Computer Science and Engineering
U19CS522 – THEORY OF COMPUTATION
(Regulation 2019)

Time : Three Hours | Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

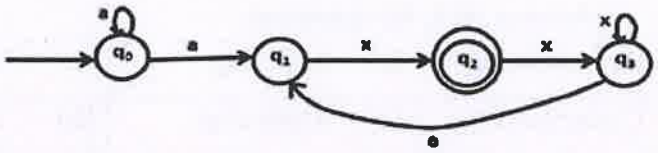
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Construct DFA that accepts input string of 0's and 1's that end with '11'.	2	K2	CO1
2.	Construct regular expression to Finite automata. R = (0+1)*.	2	K3	CO1
3.	Give regular expressions for the following L1=set of all strings of 0 and 1 ending in 00 L2=set of all strings of 0 and 1 beginning with 0 and ending with 1.	2	K3	CO2
4.	Write down steps to prove a language is not regular using pumping lemma.	2	K2	CO2
5.	Give LMD and RMD for string 1010 with production S→0S|1.	2	K3	CO3
6.	Construct CFG L= { $a^n b^n$; n≥1}.	2	K3	CO3
7.	Show whether the given string "bbaa" is accepted by PDA for following transition functions $\delta(q_0,a,\$) = (q_0,a\$)$, $\delta(q_0,b,\$) = (q_0,b\$)$, $\delta(q_0,b,a) = (q_0,\varepsilon)$, $\delta(q_0,a,b) = (q_0,\varepsilon)$.	2	K3	CO4
8.	How you prove a language is not Context Free using Pumping Lemma.	2	K2	CO4
9.	Compare finite automata and Turing machine.	2	K2	CO5
10.	Point out the role of "checking off symbols" in a Turing Machine.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	Design DFA that accepts all strings which starts with '1' over the alphabet {0,1}	7	K3	CO1
		ii.	Design a DFA to accept strings of a's and b's having even number of a's and b's.	6		
			(OR)			
	b)	i.	Design NFA that accepts strings which contains either two consecutive 0's or two consecutive 1's.	8	K3	CO1
		ii.	For the NFA given below; a. Check whether the string axxaxxa is accepted or not b. Give atleast two transition paths	5		

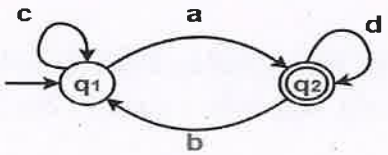


12.	a)		Find the Minimization of DFA for given DFA transition table.	13	K3	CO2

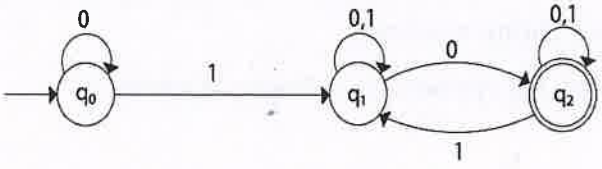
	0	1
→A	B	C
*B	D	E
*C	E	D
D	G	G
E	G	G
F	D	E
G	G	G

(OR)

	b)	i.	Find regular expression for the following DFA.	6	K3	CO2



ii. Convert the given NFA to DFA. 7



13.	a)	Convert the following grammar into CNF S→A|CB, A→C|D, B→1B|1, C→0C|0, D→2D|2.	13	K3	CO3
		(OR)			
	b)	i. State the two normal forms and give an example for each form.	3	K3	CO3
		ii. Find Greibach normal form for the following grammar S→AA | 1, A→SS |0.	10		
14.	a)	i. Let L be L(PF) for some PDA PF = (Q, Σ, Γ, δ F,q0, Z0 , F). Then there is a PDA PN such that L = N(PN) [From final state to empty stack]	7	K3	CO4
		ii. Construct a PDA for set of palindrome over the alphabet{ a, b} L(M) = {WcWR}	6		
		(OR)			
	b)	i. Construct a PDA accepting by empty stack the languages {ambmcn/m, n≥1}.	6	K3	CO4
		ii. Find PDA for the given grammar S→0S1 | 00 | 11.	7		
15.	a)	Construct a Turing Machine to accept the language L= $\{0^n1^n/n>=1\}$ and draw the transition diagram.	13	K3	CO5
		(OR)			
	b)	Design a Turing Machine to compute f(m+n) = m+n, m, n >= 0 and simulate their action on the input 0100.	13	K3	CO5

PART – C

(1 x 15 = 15Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Convert the following NFA with Σ to NFA and DFA	15	K3	CO2

q	δ (q, Σ)	δ (q,0)	δ (q,1)
A	{B}	{A}	ϕ
B	{D}	{C}	ϕ
C	ϕ	ϕ	{B}
D	ϕ	{D}	ϕ

(OR)

	b)	i. Summarize in detail about multihead and multitape TM With an example.	7	K3	CO5
		ii. Does the Turing Machine finish computing of string W in a finite number of steps with the input Turing machine and string W? Justify your answer.	8		