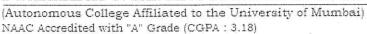


Shri Vile Parle Kelavani Mandal's

DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING





Academic Year (2021-22)

Program: B. Tech. (Computer Engg.)

Subject: Formal Language and Automata Theory

Date: 01/07/2022

04/10/2012

Year: 2 Semester: IV

Max. Marks: 75

Time: 10:30 am to 1:30 pm

Duration: 3 Hours

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

RECULAR EXAMINATION

- (1) This question paper contains 02 pages.
- (2) All Questions are Compulsory.
- (3) All questions carry equal marks.
- (4) Answer to each new question is to be started on a fresh page.
- (5) Figures in the brackets on the right indicate full marks.
- (6) Assume suitable data wherever required, but justify it.
- (7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Design FSM to check whether the given ternary number is divisible by 5.	[05]
Q1 (b)	Design Moore machine to change each occurrence of "1000" to "1001" over $\mathbf{\Sigma} = \{0,1\}$	
	OR	[10]
	Construct NFA from $r=(0+1)^*$ (00+11) and convert into min DFA.	
Q2 (a)	Convert CFG in to CNF: A -> aBa bBa B -> aB bB ϵ	[80]
Q2 (b)	Define CFG and construct a CFG for $a^{2n}b^n$. OR Let G be the grammar. Find the leftmost derivation, rightmost derivation and parse tree for the expression $a*b + a*b$ G: S -> S + S S * S S -> a b	[07]
Q3 (a)	Design PDA for recognizing: L= $\{a^nb^ma^n \mid m,n \ge 1\}$ OR	[07]
	Design PDA for recognizing : $L = \{ 0^m 1^n 0^{m+n} \mid m, n \ge 1 \}$	
Q3 (b)	Design TM for recognizing even palindrome.	[08]
Q4 (a)	Prove using pumping lemma L= $\{a^ib^i i \ge 1\}$ is not regular	[10]



Shri Vile Parle Kelavani Mandal's



DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA: 3.18)

	OR	
	Find the regular expression equivalent to the following transition diagram using Arden's theorem.	[10]
	X_0 X_0 X_1 X_2 X_3 X_3	
Q4 (b)	Write regular expression to denote a language L which accepts all the strings which being or end with either 00 or 11 and draw NFA for the same.	[05]
Q5 (a)	Explain halting problem of a Turing machine.	[10]
	OR	
Q5 (b)	Write a short note on Universal Turing Machine.	
ζυ (υ)	Explain and classify languages based on their power.	[05]

All the Best!