Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination

September 2018

Max. Marks: 20 Duration: 01 hr

Class: T.E. Semester: V

Course Code: IT54/CE55 Branch: Information Technology/Computer Engineering

Name of the Course: Theoretical Computer Science

Instruction:

(1) All questions are compulsory

(2) Draw neat diagrams

(3) Assume suitable data if necessary

Q No.		Max. Marks	CO
Q.1 (a)	Construct a Mealy machine for input from Σ^* ,where Σ = (0,1), if the input ends in '101',the output should be 'X'; if the input ends in '110',output should be 'Y' ;otherwise ,output should be 'Z'.	04	CO1
Q.2 (a)	Consider the following grammar S $\rightarrow AB \mid aaB$ $A \rightarrow a \mid Aa$ $B \rightarrow b$ (i) Show that the grammar is ambiguous (ii)Construct an unambiguous grammar that describe the same language	 02 03	 CO3 CO3
	OR		
Q.2 (a)	Convert the following CFG to CNF S $\rightarrow ABA$ $A \rightarrow aA \mid \epsilon$ $B \rightarrow bB \mid \epsilon$	05	CO3
Q.3 (a)	Write Regular expressions for the following languages over a,b a. The set of Strings of length congruent 2 Mod 3 b. The set of strings such that two a's should not come together c. L ={ uvw | u, w belongs to Σ^* and $\|v\|$ =2}	03	CO2
Q.3 (b)	Design CFG for the following languages a. L = { $a^m b^n$ |where m $\geq 2, n \geq 3$ } b. L = { $a^i b^j C^k$ |where k = i+j and i,j$\geq$ 1}	02	CO3

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Q.4	Consider the following NFA: δ | ε | a | b 1 | 2 | 3 | - 2 | - | 2 | - 3 | 4 | - | 3 4 | - | 5 | 2 5* | 1 | - | - a)Construct NFA without ϵ -transitions b)Convert the automation to DFA	06	CO1

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