K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

Nov – Dec 2025	
B. Tech. Program: (Computer Engineering) B.Tech Scheme: IIB /II	
Supplementary Examination:TY Semester: V	
Course Code: CEC501 and Course Name:Theory of Computer Science	
Date of Exam: 26/11/25 Duration: 02.5 Hours Max. Marks: 60	

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Give FA for the set of strings containing 10.		CO1	AP
b)	Explain RE. Write a regular expression for the language of all strings over {a,b} that start and end with the same symbol.		CO2	Ap
c)	Explain Pumping lemma for regular languages.		CO2	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Design PDA for WCW^R where $W \varepsilon (a,b)^*$.		CO4	Ap
b)	Design Turing Machine for the 2's Complement of a binary number.		CO5	Ap
c)	Describe the concept of Decidability with examples of decidable problems.		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Design Moore machine to convert string 11 by 10.		CO1	Ap
b)	Explain Decision properties of RL.		CO2	U
c)	Explain Chomsky Hierarchy.		CO3	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Design PDA that accepts the following language: $L= \{a^n b^{n+1} |n >=1\}$.		CO4	Ap
b)	Design Turing Machine for $\log_2 n$ where n is a binary number and perfect power of 2.		CO5	Ap
c)	Explain Universal Turing machines.		CO5	U

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Seat No.: