

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

~~Nov - Dec 2025~~
Jan / Feb (B. Tech) Program: Computer Engineering Scheme : IIB / II
 Supplementary ~~KE~~ Examination: TY Semester: V
 Course Code: CEC 501 and Course Name: Theory of Computer Science
 Date of Exam: ~~25/11/25~~ Duration: 02.5 Hours Max. Marks: 60
30/01/26

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)	Construct equivalent grammar by removing unit production $S \rightarrow ASAaBb, A \rightarrow B, B \rightarrow b\epsilon$		CO3	AP
b)	Differentiate DPDA and NPDA		CO4	U
c)	Explain decision properties of RL		CO2	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Explain the rice theorem in detail.		CO6	U
b)	Design PDA to accept language $\{ a^{n-1} b^{2n+1} n \geq 1 \}$		CO4	Ap
c)	Explain halting problem with example	CO5	U	
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Explain variants of Turing machine with example		CO5	U
b)	Explain Chomsky Hierarchy with example		CO3	U
c)	Design FA to check whether the given decimal number is divisible by 3	CO1	Ap	
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Design turing machine for addition of two unary numbers		CO5	Ap
b)	Explain closure properties of Regular language.		CO2	U
c)	i) Compare Moore and Mealy Machine ii) Compare NFA and DFA	CO1	U	

Seat No.: