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

~~Nov. – Dec 2025~~ **FEB 2026**

(B. Tech) Program: Computer Engineering Scheme III

~~Supp~~ Regular Examination: SY Semester: III

Course Code: CEC304 and Course Name: Digital Logic & Computer Architecture

Date of Exam: **7/2/26**   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.
(4) Scientific Calculator is not allowed.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	i) Simplify following expression using Boolean Algebra $\overline{(A\overline{B} - \overline{A}B)}(A + B)$ ii) Implement EX-NOR gate using NAND gates only.		CO1	Ap
b)	Implement the following expression using 8:1 Multiplexer $F(A,B,C,D) = \pi M (0,3,5,6,8.9,10,12,14)$		CO3	Ap
c)	Explain the Micro instruction format		CO4	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Determine $(377)_{10}$ in Octal, Binary and Hexa-Decimal equivalent.		CO1	Ap
b)	Explain Memory Hierarchy in detail		CO5	U
c)	What is bus arbitration? Explain any two techniques of bus arbitration?		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	i) Obtain the IEEE 754 standards of Single precision and Double precision format for 127.125 [6M] ii) Perform 792+128 using BCD addition [4M]		CO2	Ap
b)	i) Design logic circuit diagram for J-K flip-flop using NAND gates. Give its truth table and logic symbol diagram. [6M] ii) Explain any Four Addressing Modes with example. [4M]		CO3	Ap, U
c)	i) List the various methods to design the Hardwired control unit and Explain any one with diagram in detail. [6M]		CO4	U

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	ii) Write micro program for instruction MOV A, B (copy the contents of Register B to Register A). [4M]			
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Explain the steps of Non-restoring Division Algorithm in detail with Flowchart and Divide $(1011)_2$ with $(0011)_2$ using non-Restoring Division algorithm.		CO2	Ap
b)	i) Explain the concept of locality of reference in detail wit diagram. [5M] ii) Describe Interleaved memory in detail with diagram [5M]		CO5	U
c)	Explain Instruction pipelining and the hazards associated with it.		CO6	U

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