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

~~Nov – Dec 2024~~ Jan / Feb 2025
(B. Tech / M. Tech.) Program: B. Tech. Scheme I/II/IIB/III:
Supplementary ~~Regular~~ Examination: SY Semester: III
Course Code: C304 and Course Name: Digital Logic & Computer Architecture
Date of Exam: 05-02-25 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)	Write the symbol, truth table, and output expression for each of the basic and universal logic gates.		CO1	U
b)	Explain the instruction cycle with the help of a neat state diagram		CO3	U
c)	Describe characteristics of Hardwired Control Unit		CO4	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Differentiate between Computer Organization and Computer Architecture.		CO1	U
b)	Describe Cache coherence and write policies		CO5	U
c)	Explain Amdhal's law in detail		CO6	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	Perform the following binary arithmetic operations and show the intermediate steps and the final result. i) Add the following BCD numbers: $(75)_{10}+(35)_{10}$ ii) Subtract $(1010)_2$ from $(1111)_2$ using 1's complement method. iii) Subtract $(1010)_2$ from $(1000)_2$ using 2's complement iv) Perform Binary Multiplication 1011 x 1101 v) Perform addition in hexadecimal for the numbers: (2A) + (1B).		CO2	Ap
b)	i) Explain Octal to Binary Encoder with its circuit diagram ii) Design the following expression using 8:1 Multiplexer $F(A,B,C,D) = \sum m(1,3,4,11,12,13,14,15)$		CO3	Ap

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c)	i) Draw and explain functioning of the micro-programmed control unit. ii) Describe Micro Instruction-Format in detail.		CO4	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	i) Draw the single and double precision format for representing floating point number using IEEE 754 standards and explain the various fields ii) Perform Division of the following using Restoring division algorithm for (17÷3)		CO2	Ap
b)	i) What are the types of RAM and ROM and explain it. ii) Explain Associative Memory in Detail.		CO5	U
c)	Draw and explain 4 stage instruction pipelining and briefly describe the hazards associated with it.		CO6	U

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