

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

<del>Nov-Dec 2024</del> <b>Jan / Feb 2025</b>	
(B. Tech / M. Tech.) Program: Artificial Intelligence and Data Science Scheme I/II/IIB/III:IIB	
Regular/Supplementary Examination: SY Semester: III	
Course Code: AIC304 and Course Name: Digital Logic and Computer Architecture	
Date of Exam: <del>28/11/2024</del> <b>05/02/25</b>	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 <b>two</b> questions out of three: (05 marks each)	10		
a)	Convert Decimal number to binary, octal and hexadecimal. (Use standard method and show all the steps) i) $(1032)_{10}$ ii) $(655)_{10}$		CO1	U
b)	Perform BCD subtraction using 9's complement method. i) $(39)_{10} - (43)_{10}$ ii) $(72)_{10} - (23)_{10}$		CO2	Ap
c)	What is Multiplexer? States its types and truth table.		CO3	U
Q 2	Solve any <b>two</b> questions out of three: (05 marks each)	10		
a)	Explain RISC architecture.		CO4	U
b)	List and explain memory characteristics.		CO5	U
c)	Explain Amdahl's Law and its significance in parallel computing?		CO6	U
Q.3	Solve any <b>two</b> questions out of three. (10 marks each)	20		
a)	Using Booth's algorithm performs multiplication of a given number. $(5)_{10}$ X $(7)_{10}$		CO2	Ap
b)	Represent given numbers $(12.375)_{10}$ using single-precision and double-precision floating-point formats according to the IEEE 754 standard.		CO2	Ap
c)	What is control unit? List its types and differentiate between them.		CO4	U
Q.4	Solve any <b>two</b> questions out of three. (10 marks each)	20		
a)	Consider a 2 way set associative mapped cache of size 16 KB with block size 256 bytes. The size of the main memory is 128 KB. Find-  1. Number of bits in tag 2. No. of sets in main memory. 3. No. of bits in a set.		CO5	Ap

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	4. Word size.  How many bits are required to represent a memory physical address shown with format?			
b)	Draw and explain Instruction cycle state diagram with and without interrupt handling.		CO3	U
c)	What are the different types of hazards in pipelining? Describe any two types with appropriate examples.		CO6	U

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