

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

Nov– Dec 2023

(B.Tech) Program: Artificial Intelligence and Data Science Scheme I/II/IIB/III: IIB
Examination: SY Semester: III
Course Code: AIC304 and Course Name: Digital Logic and Computer Architecture

Date of Exam: 04/12/2023

Duration: 2.5 Hours

Max. Marks: 60

Instructions:

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

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	State and prove Demoragn's theorem.	2	CO1	U
ii)	Perform Hex subtraction using 16's complement method. (4BB) ₁₆ – (18A) ₁₆	2	CO2	Ap
iii)	Draw 1:4 Demultiplexer using logic gates.	2	CO3	U
iv)	What is RISC architecture? Give examples of RISC processors.	2	CO4	U
v)	Define any two Memory characteristics.	2	CO5	R
vi)	Define Buses. State types of buses.	2	CO6	R
vii)	Draw Single precision floating point number format.	2	CO2	U
viii)	Draw five stage pipeline architecture.	2	CO6	U
Q.2	Solve any four questions out of six.	16		
i)	Write short note on "Classification of codes"	4	CO1	U
ii)	Draw the flowchart of booth's multiplication algorithm.	4	CO2	U
iii)	What is priority encoder? Draw Octal to Binary Encoder using logic gates.	4	CO3	U
iv)	Draw and explain the Delay element method with examples.	4	CO4	U
v)	Explain Interleaved memory with a suitable diagram.	4	CO5	U
vi)	Why is pipelining required? Explain 5 stage pipelining with suitable diagrams.	4	CO6	Ap

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Q.3	Solve any two questions out of three.	16		
i)	Explain the structural overview of a computer with suitable diagrams.	08	CO1	U
ii)	Explain Wilke's design for a microprogrammed control unit.	08	CO4	U
iii)	Consider a 2 way set associative mapped cache of size 64 KB with block size 128 bytes. The size of the main memory is 256 KB. Find- 1. Number of bits in tag 2. No. of sets in main memory. 3. No. of bits in a set. 4. Word size. How many bits are required to represent a memory physical address shown with format.	08	CO5	Ap
Q.4	Solve any two questions out of three.	16		
i)	Perform division of the following numbers using the restoring division algorithm. (7) / (-2)	08	CO2	Ap
ii)	What is flip flop? List types of flip flops. Write characteristics equation, Truth table and draw NAND based diagrams of any two types of flipflop.	08	CO3	U
iii)	What are the hazards? List the types and explain techniques to avoid the same.	08	CO6	U
