

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

Subject Code: AIC304

Subject Name: Digital Logic and Computer Architecture

Date:10/12/2022

Nov – Dec 2022 (B.Tech) Program: Artificial Intelligence and Data Science Examination: SY Semester: III Course Code: AIC304 and Course Name: Digital Logic and Computer Architecture 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)	What are weighted and non-weighted codes? Explain with examples	02	CO1	U
ii)	Perform binary subtraction using 2's complement method. (45) ₁₀ - (25) ₁₀	02	CO2	Ap
iii)	What is a multiplexer? Write a truth table and boolean expression of 4:1 multiplexer.	02	CO3	U
iv)	What is a vertical microprogrammed control unit?	02	CO4	U
v)	Compare RAM and ROM	02	CO5	U
vi)	State types of hazards and Identity type pipeline hazards arise in below instruction. (I1)R1<-R1+R2 (I2)R3<-R1+R4	02	CO6	U
vii)	Show IEEE 754 standards for binary floating-point representation for 32-bit single format and 64-bit double format.	02	CO2	U
viii)	Write a truth table and characteristics equation of JK flip flop.	02	CO3	R
Q.2	Solve any four questions out of six.	16		
i)	Explain Von-Neumann's architecture in detail.	4	CO1	U

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ii)	Perform BCD subtraction of given numbers using 10's complement method. $(83)_{10} - (21)_{10}$	4	CO2	U
iii)	Explain Instruction cycle state diagram with interrupt.	4	CO3	U
iv)	Write a short note on the hardwired control unit.	4	CO4	U
v)	What is Locality of reference and its types.	4	CO5	U
vi)	Draw phase timing diagram for 5 stage pipelining architecture. Number of instructions are 8. Find speed up ratio, Non Pipeline and pipeline execution time in terms of clock cycles.	4	CO6	Ap
Q.3	Solve any two questions out of three.	16		
i)	Convert a given number into Binary, Hex, Octal, BCD code, Excess-3 code and Gray code. i)(511) ₁₀ ii)(127) ₁₀	8	CO1	Ap
ii)	Explain Wilke's design for a microprogrammed control unit.	8	CO4	U
iii)	State Cache Mapping Techniques and explain one technique in detail.	8	CO5	U
Q.4	Solve any two questions out of three.	16		
i)	Perform division of the following numbers using the Non restoring division algorithm. (7/3) (7/3)	8	CO2	Ap
ii)	Implement full adder using IC74151	8	CO3	Ap
iii)	Describe Flynn's classification in detail.	8	CO6	U
