### **Model Question Paper- II with effect from 2022**

# CBCS SCHEME

### Third Semester B.E Degree Examination\_\_\_\_\_

#### **Digital Design and Computer Organization (BCS302)**

TIME: 03 Hours Max.Marks:100

- 1. Note: Answer any FIVE full questions, choosing at least ONE question from each MODULE
- 2. M: Marks, L: Bloom's level, C: Course outcomes.

		Module - 1	M	L	C
Q.1	a	Demonstrate the working of NAND & XOR gate.	6	L1	CO1
	b	Explain the working of Test Bench in Verilog.	6	L2	CO1
	c	Simplify the following Boolean function into (i) sum-of-products form and	8	L3	CO1
		(ii) product-of-sums form:			
		$F(A, B, C, D) = \Sigma(0, 6, 8, 13, 14)$			
		$d(A, B, C, D) = \Sigma(2, 4, 10)$			
		OR			
Q.2	a	Write a program in Verilog to demonstrate the working of User-Defined primitive table.	6	L3	CO1
	b	Realize $F = AB + CD$ using NAND gate only.	6	L1	CO1
	c	Simplify the following Boolean Expression using kmap:	8	L3	CO1
		$F(A, B, C, D) = \Sigma(0, 1, 3, 7, 8, 9, 10, 13, 15)$			
		$F(w, x, y, z) = \Sigma(0, 1, 2, 4, 5, 6, 7, 10, 15)$			
		Module - 2			
Q.3	a	Explain Dataflow Modeling in Verilog with an example program.	6	L2	CO2
	b	Design a Full Adder and Subtractor Circuit.	6	L3	CO2
	c	Design an Octal-to-Binary Encoder.	8	L3	CO2
		OR			
Q.4	a	Explain the working of Four-bit adders using 4-Full Adders.	6	L3	CO2
	b	Design a BCD-to-excess-3 code converter.	6	L3	CO2
	c	Demonstrate the working of SR Latch and Edge-Triggered D Flip-Flop.	8	L2	CO2
		Module - 3			
Q.5	a	Describe the Big-endian and little-endian address assignment.	5	L2	CO3

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	b	Demonstrate the Instruction Execution and Sequencing for $C \leftarrow [A] + [B]$ with block diagram.	8	L4	CO3
	c	With a block diagram, explain the basic functional units of a computer.	7	L2	CO3
		OR			
Q.6	a	With relevant example, Explain the following modes of Addressing:  i) Direct  ii) Register  iii) Index  iv) Base with index and offset  v) Autoincrement	10	L2	CO3
	b	A program with 7000 machine instructions needs an average of 3 basic steps to execute one instruction. Find the performance of the computer having a clock speed of 700 KHz.	5	L3	CO3
	С	What are Condition Code Flags? Mention the significance of the flags N, Z, V and C.	5	L1	CO3
		Module - 4			
Q.7	a	Describe DMA with its registers and controllers.	10	L2	CO4
	b	Explain the effect of size, cost and speed in Memory Hierarchy.	10	L3	CO4
		OR			
Q.8	a	Explain Hardware Interrupt, enabling/disabling of Interrupts and sequence of events in handling interrupt request from a single device.	10	L2	CO4
	b	Describe the different memory mapping functions.	10	L2	CO4
		Module - 5			
Q.9	a	Describe how an ALU performs an Arithmetic and Logic Operations along with input gating diagrams.	10	L3	CO5
	b	Explain 4-stage pipeline with diagrams.	10	L2	CO5
		OR			
Q.10	a	Explain the complete set of operations involved in executing the instruction Add (R3), R1 along with control sequence.	10	L4	CO5
	b	What are Hazards? Explain Data Hazard, Control Hazard and Structural Hazard.	10	L2	CO5