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B.Tech/M.Tech(Integrated) DEGREE EXAMINATION, NOVEMBER 2023

Third Semester

21CSS201T - COMPUTER ORGANISATION AND ARCHITECTURE

(For the candidates admitted during the academic year 2022-2023 onwards)

Note:

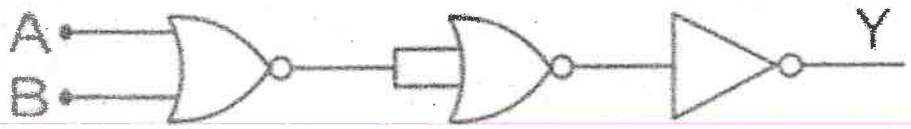
i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 75**

PART - A (20 × 1 = 20 Marks)

Answer **all** Questions

		Marks	BL	CO
1.	Decimal 43 in Hexadecimal and BCD number system is respectively (A) B2, 0100 0011 (B) 2B, 0100 0011 (C) B2, 0011 0100 (D) 2B, 0100 0011	1	2	1
2.	The 2's complement representation of –17 is (A) 01110 (B) 11110 (C) 01111 (D) 10001	1	2	1
3.	The Excess-3 code of 23 is (A) 0101 0011 (B) 0010 0000 (C) 0010 0110 (D) 0101 0110	1	1	1
4.	The equivalent gate is  (A) NOR (B) AND (C) NAND (D) OR	1	2	1
5.	RTN stands for _____ (A) Register Transmission Notation (B) Register Transfer Notation (C) Regular Transmission Notation (D) Regular Transfer Notation	1	1	2
6.	The ALU makes use of _____ to store the intermediate results. (A) Registers (B) Heap (C) Accumulators (D) Stack	1	1	2
7.	The addressing mode, where you directly specify the operand value is (A) Direct (B) Definite (C) Relative (D) Immediate	1	2	2
8.	An 24 bit address generates an address space of _____ locations. (A) 1024 (B) 4096 (C) 16,777,216 (D) 1,048,576	1	2	2
9.	What are the three components of an IEEE 754 floating-point number representation? (A) Sign, Mantissa and exponent (B) Sign, integer part and fractional part. (C) Mantissa, exponent and bias. (D) Sign, exponent and base.	1	1	3

10.	How many AND gates, Half Adders and Full Adders are required for 4X4 Array Multiplier? (A) 16,4,8 (B) 16,8,4 (C) 8,4,8 (D) 8,4,4	1	2	3
11.	The bits 1 & 1 are recorded as _____ in bit-pair recording. (A) -1 (B) 0 (C) +1 (D) both -1 and 0	1	2	3
12.	What is the value when the bit stream "11010001" is rotated right by two? (A) 00110100 (B) 01110100 (C) 01000100 (D) 01000111	1	2	3
13.	Which register in the processor is single-directional? (A) MDR (B) PC (C) MAR (D) Temp	1	1	4
14.	The Program Counter gets incremented (A) After the instruction decoding (B) After the fetch cycle (C) After the IR instruction gets executed (D) After the read cycle	1	1	4
15.	In multiple Bus organisation, the registers are collectively placed and referred to as (A) Register file (B) Set registers (C) Register Block (D) Map registers	1	1	4
16.	If the instruction, Add R1, R2, R3 is executed in a system that is pipe-lined, then the number of steps required to execute is (A) 3 (B) ~2 (C) ~1 (D) 6	1	2	4
17.	ARM processors are basically designed for (A) Main frame systems (B) Distributed systems (C) Mobile systems (D) Super computers	1	1	5
18.	SIMD stands for (A) Simple Instruction Multiple Decoding (B) Single Instruction Multiple Data (C) Sequential Instruction Multiple Decoding (D) System Information Mutable Data	1	1	5
19.	Processor which is complex and expensive to produce is (A) RISC (B) EPIC (C) Multi-core (D) CISC	1	1	5
20.	The cost of a parallel processing is primarily determined by : (A) time complexity (B) switching complexity (C) circuit complexity (D) power complexity	1	2	5

PART - B (5 × 8 = 40 Marks)

Answer **all** Questions

		Marks	BL	CO
21.	(a) i) Perform BCD Addition for 984+599. (4 marks) ii) Perform (111100) - (1011) using 1's and 2's complement method. (4 marks)	8	3	1
	(OR)			
	(b) i) Implement F=(A'+B) (C+D') E' using only NOR Gates. (4 marks) ii) Convert Binary "1010" into Gray code and also draw the logic diagram to implement the conversion. (4 marks)			

22.	(a) What is an addressing mode? What is the need for addressing in a computer system? Explain the various addressing modes with suitable examples	8	4	2
	(OR)			
	(b) Draw the Functional units of the computer and illustrate the connections between the processor and the memory.			
23.	(a) Multiply -10 X - 4 using Booth Algorithm and Bit Pair Recoding.	8	3	3
	(OR)			
	(b) Divide 10 / 3 using Non-Restoring Method. Show the operations performed in each step.			
24.	(a) Draw the Single Bus Organization and explain the execution of an instruction.	8	3	4
	(OR)			
	(b) Explain the classes of Hazards that degrades the performance of Pipe lining.			
25.	(a) What are the architecture of Flynn's Classification? Explain.	8	4	5
	(OR)			
	(b) Discuss the features, advantages and disadvantages of ARM Processor.			

	PART - C (1 × 15 = 15 Marks) Answer **any 1** Questions	**Marks**	**BL**	**CO**
26.	What is the main disadvantage of Ripple Carry Adder? Explain how it is avoided in Carry Look Ahead Adder using a 4-bit Adder design.	15	4	3
27.	i) Evaluate (A+B) * (C+D) using all 4 types of addressing instructions. (8 Marks) ii) Write an Assemble Language Program to add and subtract 16-bit numbers using 8086. (7 marks)	15	4	2

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