Semester VI (B. Tech.)

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Jaypee University of Engineering & Technology, Guna

T-1(Even Semester 2023)

18B11CI414 – COMPUTER ORGANISATION AND ARCHITECTURE

Maximum Duration: 1 Hour

Maximum Marks: 15

Notes:
1. This question paper has **03** questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

			Marks	CO No.
Q1.	**(a)**	Consider $(46)_x = (y6)_8$. Find the all possible values of x and y.	[02]	CO2
	(b)	Represent smallest and largest 4-bit fractional numbers into IEEE 754 single precision format.	[02]	
Q2.	**(a)**	A computer system executes a program of 10,000 instructions using clock rate of 3 GHz and CPI (cycles per instructions) of 1.5. Find the execution time of the program in **nano seconds**. Suppose you are required to reduce the execution time to 80% which leads to an increase of 20% in the CPI. What clock rate will be required to get this time reduction?	[02]	CO3
	(b)	Suppose your computer monitor consumes power of 50 watt per hour, CPU consumes 60 watt per hour and all other hardware components consumes total of 40 watt per hour. How much amount you have to pay monthly @ Rs 5 per unit if computer system is used 12 hours/day.	[02]	
Q3.	**(a)**	Illustrate the design of full adder using 4:1 multiplexers only. Use initial carry (C_{in}) as input line.	[02]	CO4
	(b)	Sketch the design of 2-bit, four source shared bus system using tri-state buffers which performs following micro-operations given in the table below:	[02]	

Control lines	Micro-operations
$\overline{S_1}\,\overline{S_0}$	R←A
$\overline{S_1}\,S_0$	R←B
$S_1\,\overline{S_0}$	R←C
$S_1\,S_0$	R←D

	(c)	Obtain the Boolean expressions and then sketch the design of gate level logic circuit for a seven segment which displays '**O**' and '**E**' for odd and even octal number inputs respectively.	[03]	