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COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

M.Sc. COMPUTER SCIENCE WITH SPECIALISATION IN ARTIFICIAL INTELLIGENCE
FIRST SEMESTER EXAMINATION, FEBRUARY 2022

21-344-0102 COMPUTER SYSTEM DESIGN AND ARCHITECTURE

Time: 3 Hrs.

Maximum Marks: 50

Answer any five questions

Each question carries 10 Marks

QUESTIONS		MARKS
1	a) Convert I. $(3489)_{10}$ to BCD. II. $(643)_8$ to decimal III. $(110101)_2$ to gray.	3
	b) In an 8 bit system, given $X = 42_{10}$ and $Y = 62_{10}$. Using 2's complement method calculate I. $X - Y$ II. $Y - X$	3
	c) Using K map, minimize the expression $F(A,B,C,D) = \sum m(2,3,4,9,13,15) + d(0,5,6,10)$.	4
2	a) Represent the given numbers $A = (346)_{10}$ and $B = (258)_{10}$ into BCD representation. Perform the following operations. I. $A + B$ II. $A - B$	5
	b) Minimize the Boolean expression $F = AB'C' + C'D + BD' + A'C$ using K - map	5
3	a) Design a combinational circuit with three inputs and one output. I. The output is 1 when the binary value of the inputs is less than 3. The output is 0 otherwise. II. The output is 1 when the binary value of the inputs is an even number.	6

	b) Explain the working of SR flip flop using NAND and NOR gates.	4
4	a) Realize the Boolean expression $F(A, B, C, D) = \sum(1, 3, 4, 11, 12, 13, 14, 15)$ using a 4 x 1 Multiplexer	3
	b) Using a decoder and external gates, design the combinational circuit defined by the following three Boolean functions $F1 = (Y' + X)Z$ $F2 = Y'Z' + X'Y + YZ'$ $F3 = (X + Y)Z$	3
	c) Explain the working of a 4 bit binary ripple counter using D flip flop.	4
5	a) Write a program in assembly language for adding N numbers.	3
	b) Differentiate between RISC and CISC instruction set.	3
	c) What do you mean by interrupt? Explain how interrupts are handled.	4
6	a) Write notes on status registers	4
	b) Explain the design of ALU.	6
7	a) Discuss on various hazards on pipeline and how they are handled?	6
	a) Compare hardwired control and microprogramed control	4