Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Second Semester

COMPUTER SCIENCE ANDENGINEERING

U18ISI2202**:** Digital Logic and Microprocessor

COURSE OUTCOMES

CO1: Demonstrate how the logic gates and minimization techniques work.
CO2: Design a combinational circuit for performing arithmetic functions.
CO3: Analyze and study a few sequential circuits.
CO4: Develop programing code with 8086 for the basic problems.
CO5: Perform interfacing of 8086 with peripherals.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Describe the function of a 4-bit parallel adder and subtractor.	CO1	[K_1]
2.	Explain the significance of the 'carry' in a half adder circuit.	CO1	[K_2]
3.	List the advantages of using NAND and NOR gates as universal gates.	CO1	[K_1]
4.	How does a binary decoder work? Illustrate with an example.	CO2	[K_2]
5.	Distinguish between asynchronous and synchronous counters.	CO3	[K_3]
6.	Define the term 'shift register' and list its types.	CO3	[K_2]
7.	Describe the function of the 8259 Programmable Interrupt Controller (PIC).	CO5	[K_1]
8.	Sketch out the Pin Diagram of 8086	CO4	[K_1]
9.	Differentiate between combinational and sequential circuits	CO2	[K_2]
10.	Define the role of the 8254 timer in microprocessor interfacing.	CO5	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Apply the Karnaugh map technique, simplify the following Boolean function and implement the simplified expression using Basic gates. $F(w,x,y,z)=\Sigma(0,3,2,6,7,8,9,12,13)$	8	COL	[K_L]
	b)	Implement the function using a 4-to-1 multiplexer: $F(X,Y,Z)=\Sigma(1,2,5,6)$	8	CO1	[K_3]

12.	a)	Design a Full Adder circuit using only NAND gates.	8	CO2	[K_4]
	b)	Discuss the operation and applications of a Full Subtractor circuit.	8	CO2	[K_2]
13.	a)	Describe the operation of a Ring Counter and explain how it differs from a Johnson Counter.	8	CO3	[K_2]
	b)	Discuss the working principle of a JK flip-flop, including its characteristic table and excitation table.	8	CO3	[K_3]
14.	a)	Explain the structure and operation of the Dual Slope A/D Converter.	8	CO3	[K_3]
	b)	Design a 3-bit synchronous counter using D flip-flops and explain its operation.	8	CO3	[K_4]
15.	a)	Explain the different types of interrupts in the 8086 microprocessor, with examples.	8	CO4	[K_3]
	b)	Describe the architecture of the 8086 microprocessor, focusing on its functional blocks.	8	CO4	[K_2]
16.	a)	Explain the role of the 8251 USART in microprocessor interfacing, along with its block diagram.	8	CO5	[K_2]
	b)	Discuss the steps involved in data transfer using Direct Memory Access (DMA) with the 8257 controller.	8	CO5	[K_3]

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