Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: APRIL / MAY 2024

(Regulation 2018)

Second Semester

INFORMATION TECHNOLOGY

U18ITI2201: Digital Logic and Microprocessor

COURSE OUTCOMES

CO1: Demonstrate the knowledge of logic gates, Boolean algebra, minimization techniques and apply to design a combinational circuits.
CO2: Analyse and design sequential circuits.
CO3: Program 8086 for the given problems.
CO4: Interface 8086 with peripheral devices.

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

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	How can a DEMUX be used as a decoder?	CO1	[K_2]
2.	How many bits are required to represent the decimal numbers in the range 0 to 999 using straight binary code and using BCD code?	CO1	[K_1]
3.	Mention the applications of a shift register.	CO2	[K_3]
4.	Recall the truth table for D flip flop.	CO2	[K_1]
5.	What is the significance of state minimization in sequential circuits?	CO2	[K_1]
6.	How does an synchronous counter differ from a synchronous counter?	CO2	[K_2]
7.	Explain how DMA speed up the memory access.	CO4	[K_2]
8.	Why is memory segmentation used in 8086 microprocessor?	CO3	[K_1]
9.	Describe the function of the 8255 PPI.	CO4	[K_2]
10.	Explain the use of software interrupts in 8086.	CO3	[K_2]

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

11.	**Scenario:** You are tasked with designing a digital lock system that uses a combination of logic gates. The lock opens when a specific 4-bit input (key) is entered.				
	a)	Explain how you would design the circuit using Boolean algebra and Karnaugh maps for simplification.	7	CO1	[K_4]
	b)	Design a combinational circuit for the lock system using basic logic gates. Provide the truth table and logic diagram.	7	CO1	[K_5]
	c)	What are the limitations of using combinational circuits for security systems?	2	CO1	[K_2]
12.	Scenario: A manufacturing unit requires a sequential circuit to control a conveyor belt system. The system has start, stop, and emergency stop buttons.				
	a)	Design the state diagram and state table for the sequential circuit that controls the conveyor belt.	7	CO2	[K_4]
	b)	Explain how you would implement the circuit using JK flip flops.	7	CO2	[K_5]
	c)	Discuss the importance of edge triggering in flip flop circuits.	2	CO2	[K_2]
13.	a)	Explain the process of designing a 4-bit parallel adder using full adders.	7	CO1	[K3]
	b)	Describe the working of a 4-bit shift register and its applications.	7	CO2	[K4]
	c)	What are the advantages of using a universal shift register?	2	CO2	[K2]
14.	a)	Design a synchronous BCD counter.	7	CO2	[K3]
	b)	Implement the above counter using T flip-flops.	7	CO2	[K3]
	c)	How many flip-flops are needed to get a modulo-n counter?	2	CO2	[K3]
15.	a)	Write an assembly language program for 8086 to perform addition of two 16-bit numbers.	7	CO3	[K3]
	b)	Explain the different types of addressing modes in 8086 with examples.	7	CO3	[K4]
	c)	How does memory segmentation benefit the 8086 microprocessor?	2	CO3	[K2]
16.	a)	Describe the architecture of the 8086 microprocessor with a neat diagram	7	CO3	[K3]
	b)	Explain the operation of the 8255 PPI and its modes of operation.	7	CO4	[K4]
	c)	What is the role of control signals in 8086 microprocessor?	2	CO3	[K2]

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