KUMARAGURU
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B.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018A)

Fourth Semester

MECHATRONICS ENGINEERING

U18MCT4103: Digital Electronics and Microprocessor

COURSE OUTCOMES

CO1: Use number systems, Boolean algebra and explain various digital logic families.

CO2: Apply basic logic gates to design simple circuits and simplify logic circuits using K- Map.

CO3: Design various combinational and sequential circuits.

CO4: Explain the architecture of 8085 microprocessor.

CO5: Develop assembly language program for 8085 for the given application.

CO6: Construct interface for memory and I/O 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.	Subtract the number 1000_B from 0011_B using 2's complement.	CO1	[K3]
2.	Implement an AND gate using NOR gates.	CO2	[K3]
3.	How does a carry look-ahead adder reduce propagation delay?	CO3	[K2]
4.	Distinguish between PROM and PLA.	CO3	[K2]
5.	Explain race-around condition in JK flipflop.	CO3	[K2]
6.	Obtain the characteristic equation of T flipflop.	CO3	[K2]
7.	Categorize the maskable and non-maskable interrupts in 8085.	CO4	[K2]
8.	Write two instructions of 8085 that moves a byte from location 8000_H to accumulator using indirect addressing.	CO5	[K3]
9.	Which control signals of 8085 are used in data transfer from peripheral (I/O) devices?	CO6	[K2]
10.	Differentiate between synchronous and asynchronous data transfer in serial communication.	CO6	[K3]

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

11.	a)	Implement a 2-input NAND gate using CMOS logic and explain the working.	8	CO1	[K$_2$]
	b)	Using K-map, determine the minimal sum and minimal product for the given function: $f(x, y, z) = \sum m(2, 4, 5, 6, 7)$	8	CO2	[K$_3$]
12.	a)	Implement a parallel adder to add two 3-bit binary numbers.	8	CO3	[K$_3$]
	b)	Realize the given function using multiplexer: $f(x, y, z) = \sum m(2, 3, 4, 5, 7)$	8	CO3	[K$_3$]
13.	a)	Explain how edge triggering is implemented with D flipflop as example.	8	CO3	[K$_2$]
	b)	Design and implement a 3-bit binary ripple down counter using JK flipflops. Give the schematics and state table.	8	CO3	[K$_3$]
14.	a)	Enumerate the registers present in 8085 microprocessor and explain the function of each.	8	CO4	[K$_2$]
	b)	Write an assembly language program for 8085 to add two decimal numbers 43$_D$ and 59$_D$ and store the result in memory.	8	CO5	[K$_3$]
15.	a)	Design an interface for the peripheral IC 8255 with the 8085 microprocessor. Ensure that the address space is partitioned appropriately with all requisite pins connected.	10	CO6	[K$_3$]
	b)	Briefly explain the architecture and function of 8255 IC.	6	CO6	[K$_2$]
16.	a)	Implement a 4-bit ring counter with schematics and state table.	8	CO3	[K$_3$]
	b)	Explain the function of 8279 IC with a block diagram.	8	CO6	[K$_2$]

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