PRN:		Course Code:	UEC305

Second Year **B. Tech** End Semester Examination Winter 2023

Digital Electronics

Day and Date: Thursday, 07/12/2023 Max Marks: **100**

Time: 10.30 am to 1.30 pm Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Illustrate in detail any four characteristics/specifications of Digital ICs.	08	L1	CO1
	b)	Compare and contrast between the TTL and CMOS digital IC families.	08	L3	CO1
		OR			
	b)	Describe CMOS technology and explain CMOS inverter gate	08	L3	CO1
Q.2		**Attempt the following**			
	a)	State and prove the following laws of Boolean algebra. i) Associative Laws ii) Commutative Laws iii) De-Morgan's Theorem	08	L2	CO2
	b)	Describe the procedure to reduce the Boolean Expressions.	08	L2	CO2
		OR			
	b)	Reduce the following expressions using Boolean algebra. i) $f = A + B\,[\,AC + (B + \overline{C})D]$ ii) $f = (B + BC)\,(B + \overline{B}\,C)(B + D)$	08	L2	CO2
Q.3		**Attempt any two from the following**			
	a)	What is significance of Karnaugh-Map, Draw K-Maps for 2,3, and 4 variables and describe the steps to reduce the equation.	08	L1	CO3
	b)	Minimize the following in SOP form and implement using basic gates (AOI) logic. i) $f=\sum m\,(0,1,3,4,5,7)$ ii) $f=\sum m\,(1,4,5,6,9,12,13,14)$	08	L4	CO3
	c)	Obtain minimal POS expression for the given function & implement it in NOR logic. $f=\Pi M\,(2,8,9,10,11,12,14)$	08	L4	CO3
Q.4		**Attempt any two from the following**			
	a)	Describe Full Adder circuits with logic diagram and truth table.	08	L3	CO3
	b)	Design a 4-Bit Binary to Gray Code converter.	08	L3	CO3
	c)	Illustrate 4:1 Multiplexer with truth table and realize using basic gates.	08	L3	CO4

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Q.5		**Attempt any Two of the following**			
	a)	Explain following Flip Flops with neat schematic, Truth table and Logic symbol. i) Clocked SR flip flop ii) J-K Flip Flop	09	L2	CO4
	b)	Describe operation of serial in serial out shift Register.	09	L2	CO4
	c)	Compare and contrast between combinational circuits and sequential circuits.	09	L4	CO4
Q.6		**Attempt any Two of the following**			
	a)	Illustrate the finite state machines state table and state diagram with a suitable example.	09	L4	CO4
	b)	Describe the structure of read only memory (ROM) and mention its types.	09	L2	CO4
	c)	Compare and contrast between following memory devices: i) RAM and ROM ii) SRAM and DRAM	09	L3	CO4

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