PRN:		Course Code:	U15PC302

Second Year **B. Tech** End Semester Examination Winter 2024

Digital Circuit Design

000189

Day and Date: Mon 25 NOV 2024 Max Marks: **50**

Time : 10:30AM To 12:30PM Duration: **02** hrs

Instructions:

1. All questions are compulsory.
2. Assume suitable data wherever necessary and mention it clearly.

			Marks	Bloom's Level	CO
Q.1		**Attempt any two the following Question.**			
	a)	Describe in detail the various performance characteristics of digital IC families.	5	L2	1
	b)	Illustrate the process of reducing the Boolean expression with an example.	5	L2	1
	c)	Write all the Boolean algebraic laws.	5	L2	1
Q.2		**Attempt any one the following Question.**			
	a)	Reduce the following expressions using Boolean algebra. i) $f = A [B+\overline{C}\ \overline{(AB + A\overline{C})}]$ ii) $f = A+B [AC+ (B+ \overline{C})D]$	10	L3	2
	b)	State and prove the De-Morgan's laws of Boolean algebra.	10	L3	2
	c)	Compare and contrast between the TTL and CMOS digital IC families.	10	L3	2
Q.3		**Attempt the following Question.**			
	a)	Simplify the Boolean functions using K-map & implement the simplified expression using NAND gates. $f = \sum m (0,1,2,3,5,7,8,9,10,12,13)$	10	L3	3
		OR			
	b)	Minimize the following in POS form and implement using basic gates (AOI) logic. $f = \Pi M (0,1,2,3,4,7)$	10	L3	3
Q.4		**Attempt the following Question.**			
	a)	Describe following circuits with logic diagram and truth table. i)Half Adder ii) Full Adder	10	L4	4
		OR			
	b)	Compare and Contrast between i) Multiplexer (MUX) & Demultiplexer (DEMUX). ii) Encoders & Decoders	10	L4	4
Q.5		**Attempt the following Question.**			
	a)	Explain following Flip Flops with neat schematic, Truth table and Logic symbol. i) SR flip flop ii) J-K Flip Flop iii) D-Type Flip Flop iv) T- Type Flip Flop	10	L4	4
		OR			
	b)	Compare and contrast between following memory devices: i) RAM and ROM ii) SRAM and DRAM	10	L4	4

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