PRN:		Course Code :	ELE2401

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

Digital Electronics

000945

Day and Date: Mon 2 DEC 2024 Max Marks: **100**

Time : 02:00PM To 05.00PM Duration: **03** hrs

Instructions: All questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Attempt the following**			
a)	Define inequality detector (EX-OR gate) and equality detector (EX-NOR gate). Describe special purpose logic gates in short: ❖ Exclusive-OR Gate (X-OR) ❖ Exclusive-NOR Gate (X-NOR)	08	L1	CO1
b)	Universal Logic Gates Function Using Only NOR gate with truth tables	08	L2	CO1
	OR			
b)	Universal Logic Gates Function Using Only NAND gate with truth tables	08	L2	CO1
Q.2	**Attempt the following**			
a)	State and explain De-Morgan's theorem with example	08	L3	CO1
b)	i. Perform the following conversions i. $(110101.101010)_2 = (\quad)_8$ ii. $(5C7)_{16} = (\quad)_{10}$ iii. $(4057.06)_8 = (\quad)_{10}$ $(2598.675)_{10} = (\quad)_{16}$	08	L3	CO1
	OR			
b)	State and explain following laws of Boolean algebra: i. Associative law ii. Distributive law	08	L2	CO1
Q.3	**Attempt any two from the following**			
a)	Perform the following conversions. I. $(756.603)_8 = (\quad)_{16}$ II. $(378.93)_{10} = (\quad)_8$ III. $(101111010001)_2 = (\quad)_{10}$ IV. $(B9F.AE)_{16} = (\quad)_8$	08	L3	CO2

Backlog

	b)	Reduce the following expressions:	08	L3	CO2
		i. $f = A[B + \bar{C}(\overline{AB + A\bar{C}})]$.			
		ii. $f = A + B[AC + (B + \bar{C})D]$.			
	c)	Prove the following expressions	08	L3	CO2
		i. $AB + A\bar{B}C + B\bar{C} = AC + B\bar{C}$.			
		ii. $A\bar{B}C + B + B\bar{D} + AB\bar{D} + \bar{A}C = B + C$.			
Q.4		**Attempt any two from the following**			
	a)	Draw and explain 8 to 1 line multiplexer.	08	L3	CO2
	b)	Explain half adder and full adder with logic diagram and truth table.	08	L3	CO2
	c)	Write a short note on 1 bit & 2 bit magnitude comparator.	08	L3	CO2
Q.5		**Attempt any Two of the following**			
	a)	Explain D flip-flop with logic diagram and truth table.	09	L3	CO3
	b)	Describe J-K flip-flop with logic diagram and truth table.	09	L3	C03
	c)	Reduce the following expression using mapping (k-map): i. $f = \sum m\ (2,3,6,7,8,10,11,13,14)$ ii. $f = \pi M\ (2,8,9,10,11,12,14)$	09	L4	CO3
Q.6		**Attempt any Two of the following**			
	a)	Illustrate two bit ripple Up-counter and Down-counter (using positive edge triggered FF's) with timing diagram.	09	L3	CO4
	b)	Define counter. Point out the difference between Synchronous (Parallel) and Asynchronous (Ripple) counter.	09	L3	CO4
	c)	Define shift register. Explain the following mode of data transmission in shift register: - SISO and SIPO.	09	L3	CO4

*****

Backlog