Total number of printed pages:2

D/3rd Semester/DECE303

## 2024

## **DIGITAL ELECTRONICS**

Full Marks : 100

Time : Three hours

## The figures in the margin indicate full marks for the questions.

Answer any five questions.

1	a)	Convert each of the following bey values to decimal	2×5-10
1.	<i>a)</i>	(i) 92 (ii) 2C0 (iii) 1A6 (iv) 7FF (v) 37FD	2/0-10
	b)	Show how to connect NAND gates to get an AND gate and OR gate?	3
	c)	Reduce the expression $A\overline{B}C + \overline{AB}C$ using Boolean theorems	4
	d)	Apply De-Morgan's theorem to simplify $\overline{A + B\overline{C}}$	3
2.	a)	Find the Minimized logic function using K-Maps.	5
		F (A, B, C, D) = $\sum m(1,3,5,8,9,11,15) + d(2,13)$ . Implement the minimal	
		SOP using NAND gates.	
	b)	Prepare Karnaugh Map for the following functions and draw the logic	5
		diagram using basic gates.	
		(i) Y (A, B,C,D)= $\prod M(0,3,4,9,10,12) + d(2,7,8,13)$	
	c)	Design a logic circuit that will allow input signal A to pass through to the	4
		output only when control input B is LOW while control input C is High	
		otherwise, the output is LOW.	
	d)	Why Multiplexer is called data selector? Develop the following functions:	2+4=6
		(i) Full adder using multiplexer.	
3.	a)	Distinguish between combinational and sequential circuits.	4
	b)	What is Demultiplexer? Describe the operation of 1:8 Demultiplexer.	2+5=7

	c)	What is race around condition? How does it get eliminated in a Master-	2+7=9
		slave J-K flip-flop? Explain.	
4.	a)	What is flip flop? Explain different types of flip flops with truth table and	4
		diagram.	
	b)	Illustrate the design procedure of a MOD-5 synchronous counter using JK	10
		flip-flops and implement it.	
	c)	Design a Modulo – 7 up Asynchronous (Ripple Counter).	6
5.	a)	Analyze the operation of 4-bit SISO shift register and draw its waveforms.	6
	b)	Distinguish between volatile and non-volatile memory.	4
	c)	Write the difference between ROM and RAM. Also list the types of ROMs.	5
	d)	What is the difference between EPROM and EEPROM? What are the	5
		advantages of EEPROM over EPROM?	
6.	a)	Using D flip-flop, design a synchronous counter which counts in the	5
		sequence 000,001,010,011,100,101,110,111,000.	
	b)	Write short notes on the following terms:	3×5=15
		(i) Full adder (ii) BCD to 7 segment decoder (iii) 3-bits up/down	
		counter.	
		ESTD. : 2006	

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