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BE SEMESTER III EXAMINATION JAN 2022

Sub code: CT304-N   Sub Name: Digital Electronics

Date: 21 /01/2022   Time: 12:30 PM to 03:30 PM   Total Marks: 70

Instructions:

1. Answer Each Section in Separate Answer sheet.
2. Use of Scientific Calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of supplementary for rough work.

SECTION I

Q.1 (a)	(1) $(123)_{10} = (?)_2$ (2) $(101011)_2 = (?)_{10} = (?)_8$ (3) $(153)_{10} = (?)_8 - (?)_{16}$	[05]
(b)	Justify the statement: "NAND Gate is universal gate".	[05]
(c)	Explain Gray Code.	[05]

OR

(c)	Prove (1) x+x=x (2) x+xy=x using postulates and theorems.	[05]
Q.2 (a)	Convert the following to the other canonical form: $F(A,B,C,D)=\sum(1,2,3,6,11,13,14)$	[05]
(b)	Express following function in a sum of minterms and a product of maxterms $F(A,B,C)=A+B'C$.	[05]

OR

Q.2 (a)	Show that the dual of the exclusive-OR is equal to its complement.	[05]
(b)	Simplify following Boolean functions using theorems and postulates: (1) A+B[AC+(B+C')D] (2) (B+BC)(B+B'C)(B+D)	[05]
Q-3 (a)	Simplify the Boolean function with k-map $F(w,x,y,z)=\sum(0,1,2,4,5,6,8,9,12,13,14)$	[05]
(b)	Design half-subtractor and full-subtractor.	[05]

OR

Q-3 (a)	Determine the prime-implicants of the function: $F(w,x,y,z)= \sum(1,4,6,7,8,9,10,11,15)$	[05]
(b)	Explain 3 to 8 line Decoder with necessary diagram.	[05]

Q.4 (a) Compare combinational circuit and sequential circuit. [05]

(b) Explain magnitude comparator. [05]

(c) Implement the following function with a multiplexer: [05]
$F(A,B,C)=\sum(1,3,5,6)$

OR

(c) Explain 4 to 1 line multiplexer. [05]

Q.5 (a) Explain D Flip-Flop [05]

(b) Explain 4-bit ripple binary counter with J-K Flip-Flop [05]

OR

Q.5 (a) Explain JK Flip-Flop [05]

(b) Explain Serial in/Serial out shift register with necessary diagram. [05]

Q-6 (a) Explain ROM. [05]

(b) Explain 4-bit synchronous binary counter. [05]

OR

Q-6(a) Explain R-2R Ladder Type DAC. [05]

(b) Explain PLA using suitable example. [05]