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Sardar Patel University
Instrumentation and Digital Electronics
US03CELE 22   B. Sc. III-Sem.

Friday, 01-01-2021
02.00 pm to 04:00 pm
Marks 70

(10)

Q 1 : Multiple Choice Questions:

(1) Error is defined as deviation from
    (i) True value of measured variable
    (ii) Average value of measured variable
    (iii) Absolute value of measured variable
    (iv) None of the above.

(2) The full form of CRO is
    (i) Cathode Ray Oscillator
    (ii) Cathode Ray Oscilloscope
    (iii) Cathode ray Tube
    (iv) Cathode ray transistor

(3) The expression for -20 in 2's complement system is
    (i)   1111 1100
    (ii)   1110 1100
    (iii) 1011 1100
    (iv)   1100 1001

(4) 1's and 2's complement system is used to represent ---------------numbers
    (i)   Positive numbers
    (ii)   Negative numbers
    (iii) Complex numbers
    (iv)   Irrational numbers

(5) Octal number system has ----------- unique symbols.
    (i)   8
    (i)   16
    (ii)   2
    (iii) 4

(6) The code which is used to reduce errors in binary airthemetic is
    (i) XS3 Code
    (ii) Gray Code
    (iii) 8421 code
    (iv) 5211 code

(7) The Gray code for binary code 11001101_2 is
    (i) 101110011
    (ii) 101101100
    (iii) 101100110
    (iv) 10101011

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[P.T.O]

(8) By forming octate we can reduce -----------variables in Karnaugh mapping
   (i) 1 variable
   (ii) 2 variables
   (iii) 3 variables
   (iv) 4 variables

(9) The fundamental operators of Boolean Algebra are
   (i) AND, OR, NOT
   (ii) XOR, XNOR
   (iii) NAND, NOR
   (iv) None of the above

(10) According to Boolean algebra, 1+1=
   (i)   2
   (ii)   0
   (iii) 1
   (iv)   10

Q2: Fill in the blanks. (04)

1. Sensitivity is the ratio of out signal or response of the instrument to a change of ----------------.

2. The binary equivalent number of $ABCD_{16}$ is ------------- .

3. The code in which each succeeding code is one binary bit greater than preceding code is ----------------.

4. Demorgan's theorem is stated as "Break the line --------------".

Q2: True or False. (04)

1. The full form of CRT is Cathode Ray Tube.
2. The Octal number system has got radix =4.
3. Gray code is non-weighted binary code.
4. The universal building blocks are NAND and OR .

Q.3 Answer any ten questions briefly. (20)

1. Define Error.
2. List the names of Errors you know.
3. Draw block diagram of CRO.
4. Convert the given Binary Numbers to decimal: a)10010101; b)11011100
5. Convert the following Hexadecimal to the decimal: a) A13B b)7CA3
6. Subtract AAC_{16} from $B8027_{16}$.
7. Define Weighted Binary Code and Non weighted Binary Code.
8. Define Sequential code giving examples.
9. Define Reflective code giving examples.
10. Construct AND, OR and NOT gate using NAND gate.
11. State utility of De Morgan's theorem.

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12. Demorganize the function $\overline{\overline{AB} + \overline{AC}}$

Q.4 Long Answer question. (Answer any 4 out of 8)   [32]

1. Write shortnote on Errors.
2. Draw the block diagram of Oscilloscope and give function of each block and Explain basic working of CRO.

3(a) Multiply the given Hexadecimal numbers 94EC x A5.

3(b) Add given decimal numbers using eight-bit two's complement system: -154 and -66.

3(c) Convert $ABCD_{16}$ to Octal.

4(a) Multiply 1001_2 x 110_2 using computer method.

4(b) Multiply the given Hexadecimal numbers 89BC x AA.

4(c) Convert the following Binary number to Hexadecimal:

   a) 1010110110111   b) 10110111011011

5(a) Add 6748 to 5972 in BCD (8421) code.

5(b) Add 247.6 to 359.4 in XS3 code.

5(c) Subtract 175 from 267 in XS3 code.

6(a) Add 5085 to 9322 in BCD (8421) code.

6(b) Add 37 to 28 in XS3 code.

6(c) Subtract 27.8 from 57.6 in XS3 code.

7(a) Reduce the given Boolean expression using Boolean laws i) $\overline{\overline{AB} + ABC} + A(B + \overline{AB})$.

7(b) Reduce the expression in SOP form $F = \sum m(2,3,5,7,8,9,11,12,13,14,15)$ and implement in NAND logic.

8(a) Draw circuit of NOT gate and discuss its working for different input conditions.

8(b) Find the POS and SOP form of $Y = \sum m(0,1,3,6,7,8,9,13,15)$ .Which is less expensive?

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