

EC121 Digital Logic Design

Quiz # 2—SecA

(Solution)

Q - 1 Represent the sum of decimal numbers 791 and 658 in BCD.

Sol:

$$\begin{array}{r}
 0111\ 1001\ 0001 \\
 0110\ 0101\ 1000 \\
 \hline
 1110\ 1110\ 1001 \\
 0110\ 0110 \\
 \hline
 0001\ 0100\ 0100\ 1001
 \end{array}$$

Answer = (0001 0100 0100 1001)_{BCD}

Q - 2 Reduce the following Boolean expression $\bar{W}X(\bar{Z} + \bar{Y}Z) + X(W + \bar{W}YZ)$ to 1 literals.

Sol:

$$\begin{aligned}
 &= \bar{W}X\bar{Z} + \bar{W}X\bar{Y}Z + WX + \bar{W}XYZ \\
 &= \bar{W}X\bar{Z} + \bar{W}XZ + WX \\
 &= \bar{W}X + WX \\
 &= X
 \end{aligned}$$

Q - 3 Obtain the truth table of the following Boolean function and determine the Boolean expression in sum of minterms and product of maxterms.

$$F(X, Y, Z) = (XY + Z)(Y + XZ)$$

Sol:

Truth Table

A	B	C	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

$$\begin{aligned}
 \text{Sum of Minterms} &= \bar{X}YZ + X\bar{Y}Z + XY\bar{Z} + XYZ \\
 &= m_3 + m_5 + m_6 + m_7 \\
 &= \sum (3,5,6,7)
 \end{aligned}$$

$$\begin{aligned}
 \text{Product of Maxterms} &= (X + Y + Z)(Z + Y + \bar{Z})(X + \bar{Y} + Z)(\bar{X} + Y + Z) \\
 &= M_0 \cdot M_1 \cdot M_2 \cdot M_4 \\
 &= \prod (0,1,2,4)
 \end{aligned}$$