

## EC121 Digital Logic Design Quiz # 2—SecB (Solution)

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

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

Answer = (0001 0100 0100 1001)<sub>BCD</sub>

**Q - 2** Reduce the following Boolean expression  $Y + \bar{X}Z + X\bar{Y}$  to 3 literals.

$$\begin{aligned}
 &= (Y + X)(Y + \bar{Y}) + \bar{X}Z \\
 &= Y + X + \bar{X}Z \\
 &= Y + (X + \bar{X})(X + Z) \\
 &= X + Y + Z
 \end{aligned}$$

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

$$F(X, Y, Z) = (\bar{A} + B)(\bar{B} + C)$$

Truth Table

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

$$\begin{aligned}
 \text{Sum of Minterms} &= \bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}BC + ABC \\
 &= m_0 + m_1 + m_3 + m_7 \\
 &= \sum (0,1,3,7)
 \end{aligned}$$

$$\begin{aligned}
 \text{Product of Maxterms} &= (A + \bar{B} + C)(\bar{A} + B + C)(\bar{A} + B + \bar{C})(\bar{A} + \bar{B} + C) \\
 &= M_2 \cdot M_4 \cdot M_5 \cdot M_6 \\
 &= \prod (2,4,5,6)
 \end{aligned}$$