COE 202

Fundamentals of Computer Engineering

Practice Problems

Q.1. For the Boolean function E and F, as given in the following truth table:

X	Y	Z	E	F
0	0	0	1	0
0	0	1	1	0
0	1	0	1	1
0	1	1	0	0
1	0	0	1	0
1	0	1	0	0
1	1	0	0	1
1	1	1	0	1

(i) List the minterms and the maxterms of each function.

(ii) List the minterms of E' and F'.

(iii) List the minterms of E + F and E . F.

(iv) Express E and F in sum-of-minterms algebraic form.

(v) Simplify E and F to expressions with a minimum number of literals.

Q.2. Simplify the following Boolean functions **F**. Find all prime implicants and essential prime implicants, and apply the selection rule.

(i) $F(A, B, C)=\Sigma\, m(3, 5, 6)$

(ii) $F(A, B, C, D)=\Sigma\, m(4, 6, 7, 8, 12, 15)$

(iii) $F(A, B, C, D) =\Pi\, M(1, 3, 5, 6, 7, 9, 10, 11, 14)$

Q.3. Simplify the following Boolean functions **F** in (1) sum-of-products and (2) product-of-sums form:

(i) $F(W, X, Y, Z)=\Sigma\, m(0, 1, 2, 3, 7, 8, 10)$

(ii) $F(A, B, C, D)=\Sigma\, m(3, 4, 13, 15)$

(iii) $F(A, B, C, D, E, F)=\Sigma\, m(6, 9, 13, 18, 19, 25, 27, 29, 41, 45, 57, 61)$

Q.4. Simplify each of the following expressions:

(i) WX` + WXZ + W`Y`Z` + W`XY` + WXZ`

(ii) XZ + XYZ` + WX`Y`