Q1

A B C D EW

X X 1 1 1

1 1 1 0 0

1 1 0 1 0

1 0 1 0 1

1 0 0 1 1

0 0 1 0 1

0 1 1 0 1

0 0 0 1 1

0 1 0 1 1

0 0 0 0 1

A B C D NS

1 1 0 1 1

1 1 1 0 1

1 1 0 0 1

1 1 1 1 0

1 0 0 0 1

0 1 0 0 1

EW

CD

00 01 11 10

AB 00 1 1 1 1

01 0 1 1 1

11 0 0 1 0

10 0 1 1 1

EW ∏M(4,8,12,13,14) = NS ∑m(4,8,12,13,14)

= AC’D’+BC’D’+ABC’+ABD’

Q2

E =1 or D=0 or (B and C=0) or (A=0 and B=1)

X = A’B +B’C’ +D’+ E

Q3

X1 X2 X3 X4 F

0 0 0 0 1

0 0 0 1 0

0 0 1 0 0

0 0 1 1 0

0 1 0 0 1

0 1 0 1 0

0 1 1 0 0

0 1 1 1 0

1 0 0 0 1

1 0 0 1 0

1 0 1 0 0

1 0 1 1 0

1 1 0 0 0

1 1 0 1 0

1 1 1 0 0

1 1 1 1 0

F = ∑m(0,4,8)