Gate Question

January 6, 2024

1. $A\ 4 \times 1$ multiplexer with two selector lines is used to realize a Boolean function F having four Boolean variables X, Y, Z and W as shown below. S_0 and S_1 denote the least significant bit (LSB) and most significant bit (MSB) of the selector lines of the multiplexer respectively.I_o, I_1, I_2, I_3 Is are the input lines of the multiplexer.

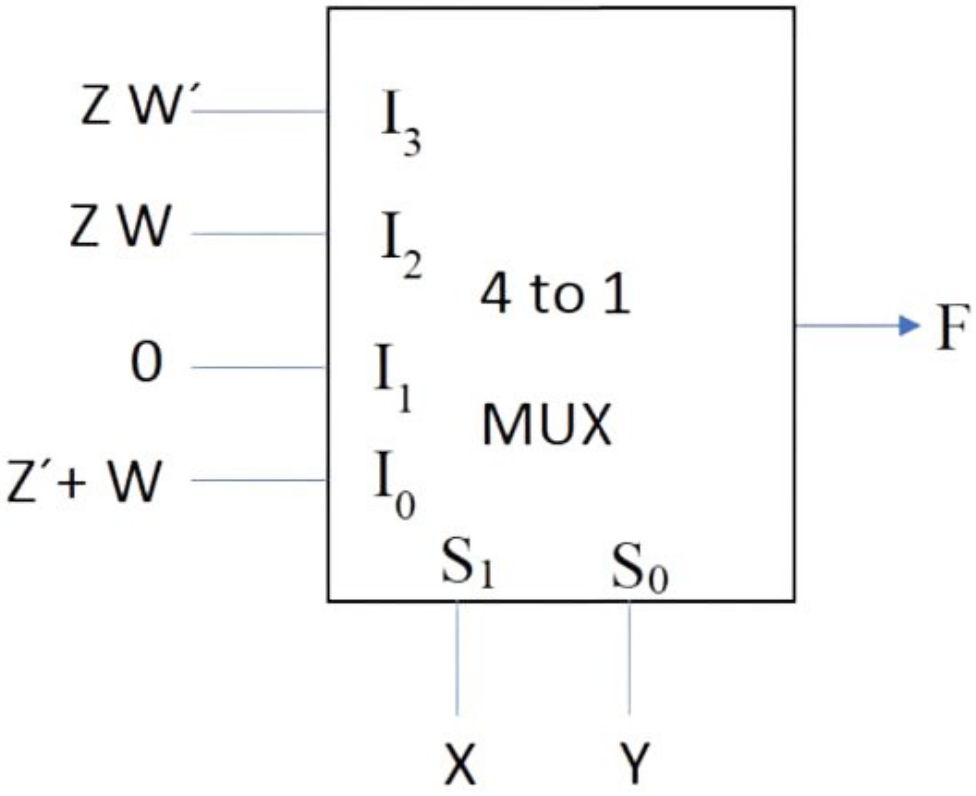

Figure 1:

The canonical sum of product representations of F is

(A) $F(X, Y, Z, W) = \Sigma\, m(0, 1, 3, 14, 15)$

(B) $F(X, Y, Z, W) = \Sigma\, m(0, 1, 3, 11, 14)$

(C) $F(X, Y, Z, W) = \Sigma\, m(2, 5, 9, 11, 14)$

(D) $F(X, Y, Z, W) = \Sigma\, m(1, 3, 7, 9, 15)$