

Gate Question

January 6, 2024

1. A 4×1 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_0, I_1, I_2, I_3 are the input lines of the multiplexer.

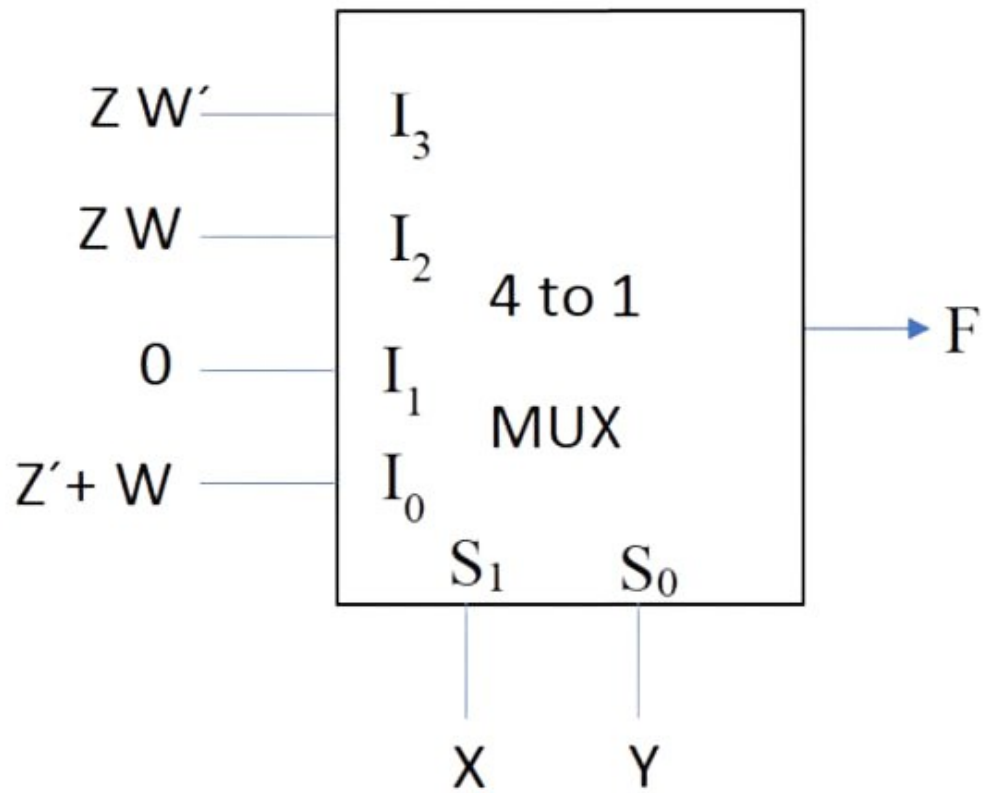


Figure 1:

The canonical sum of product representations of F is

- (A) $F(X, Y, Z, W) = \sum m(0, 1, 3, 14, 15)$
- (B) $F(X, Y, Z, W) = \sum m(0, 1, 3, 11, 14)$
- (C) $F(X, Y, Z, W) = \sum m(2, 5, 9, 11, 14)$
- (D) $F(X, Y, Z, W) = \sum m(1, 3, 7, 9, 15)$