Assignment 9 (GATE, EC 2017-16)

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0.1 QUESTION

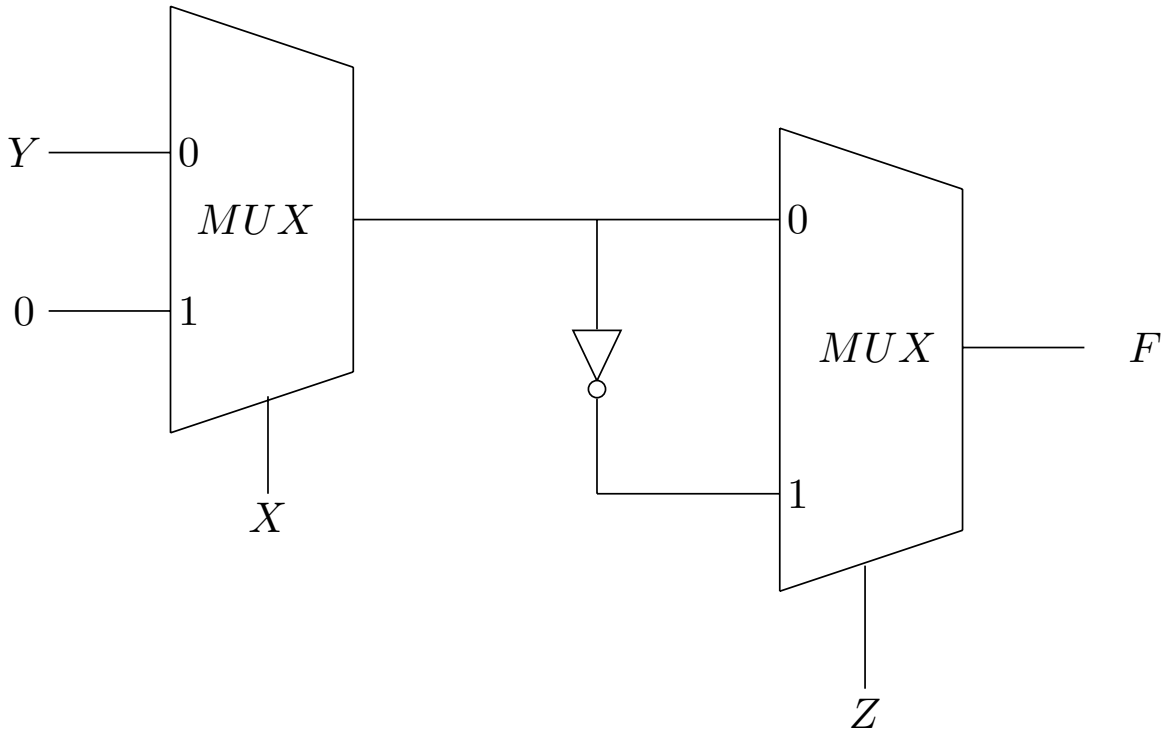

Figure 1:

Consider the circuit shown in the figure.The Boolean expression F implemented by the circuit is

1. X'Y'Z' + XY + Y'Z
2. X'YZ' + XZ + Y'Z
3. X'YZ' + XY + Y'Z

4. X'Y'Z' + XZ + Y'Z

0.2 SOLUTION

From figure 1,
In first multiplexer the input signals are Y and 0,control line is X.According to this the output signal is X'Y
In second multiplexer the input signals are X'Y and (X'Y)' control line is Z.The output signal is F.

F = X'YZ' + ((X'Y)')Z

= X'YZ' + (X + Y')Z (Using demorgan laws)

= X'YZ' + XZ + Y'Z
So the boolean expression F implemented by the circuit is

$$F = X'YZ' + XZ + Y'Z \qquad (1)$$

0.3 CIRCUIT

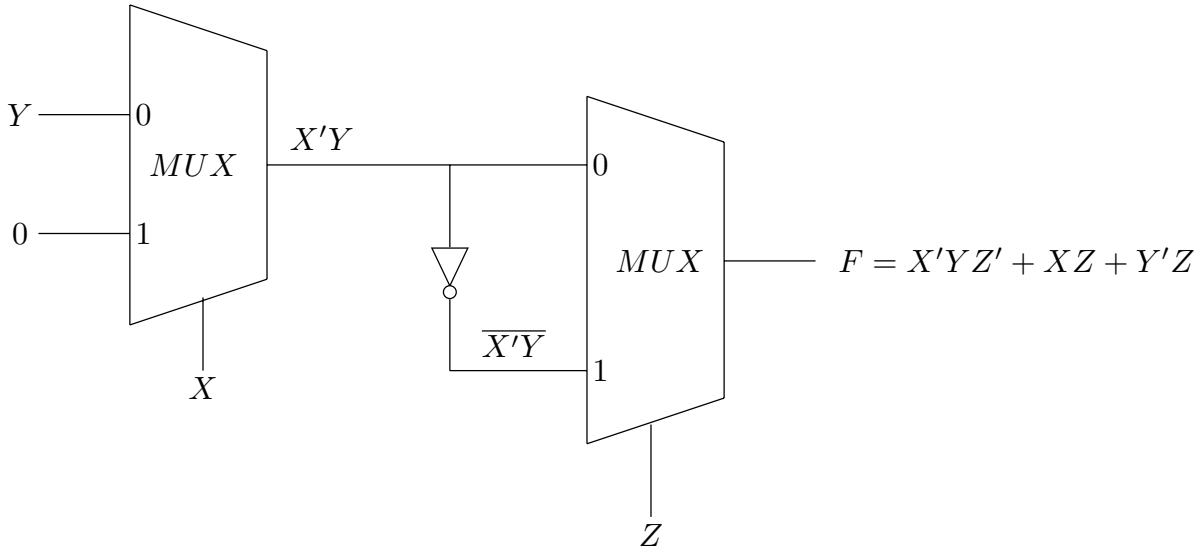

Figure 2:

From the above figure we can derive the expression of F

$$F = X'YZ' + XZ + Y'Z \qquad (2)$$

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

0.4 TRUTH TABLE of Expression F