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## Question 52

The following Karnaugh map represents a function  $F$ .

YZ	00	01	11	10
$X = 0$	1	1	1	0
$X = 1$	0	0	1	0

A minimized form of the function  $F$  is:

- (a)  $F = \overline{X}Y + YZ$
- (b)  $F = \overline{X}Y + \overline{Y}Z$
- (c)  $F = \overline{X}Y + Y\overline{Z}$
- (d)  $F = \overline{X}\overline{Y} + YZ$

## Solution

From the K-map, the cells with value 1 are at minterms:  $m_0, m_1, m_3, m_7$  (i.e. 000, 001, 011, 111).

Grouping:

- A horizontal pair in row  $X = 0$  covering columns 00 and 01 ( $m_0, m_1$ ):  
Common literals are  $X = 0$  and  $Y = 0 \Rightarrow \overline{X}\overline{Y}$ .

- A vertical pair in column 11 covering both rows  $(m_3, m_7)$ : Common literals are  $Y = 1$  and  $Z = 1 \Rightarrow YZ$ .

Thus the minimized function is  $F = \overline{X}\overline{Y} + YZ$ .

Hence, the correct answer is option (d).