ASSIGNMENT 10

ABHYUDAY

8 JAN , 2021

1 Problem Statement :

A bulb in a stair case has two switches, one switch being at the ground floor and the other one at the first floor.The bulb can be turned ON and also can be turned OFF by any one of the switches irrespective of the state of the other switch the logic in switching of the bulb resembles.

(A) an AND gate

(B) an OR gate

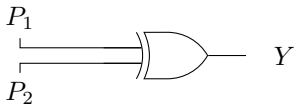
(C) an XOR gate

(D) an NAND gate

2 Answer

the answer to the given question is (c)

3 Xor gate:



4 Explanation:

let the switches be P_1 and P_2

TRUTH TABLE		
input(P_1)	input(P_2)	output(Y)
0	0	0
0	1	1
1	0	1
1	1	0

$Y = (\overline{P_1})(P_2)+(\overline{P_2})(P_1)$

From the above truth table, it can be verified that XOR logic is implemented. So that if we switch on at ground floor and switch off at top floor then the bulb enlighten. (vice versa is also true). Because in the XOR gate operation output comes ON when only one input is ON and other one is OFF. so we use XOR gate for this type of problem.