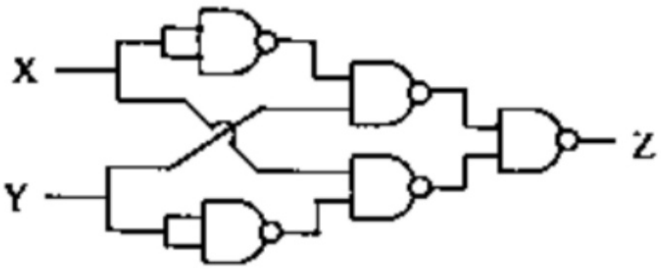
Name: K.Saisusmitha
Batch: COMETFWC018
Date: 16 may 2025

GATE QUESTION IN 2010 Q31

Question

Q.42 The logic gate circuit shown in the adjoining figure realizes the function



Options: (A) XOR (B) XNOR (C) Half adder (D) Full adder

Solution:

The given circuit has two inputs: X and Y.

The circuit uses two **AND gates** and one **OR gate**.

From the diagram, the inputs are connected to the AND gates in a crossed fashion:

1. The first AND gate receives inputs X and $\overline{Y} \rightarrow$ Output: $X \cdot \overline{Y}$
2. The second AND gate receives inputs $\overline{X}$ and $Y \rightarrow$ Output: $\overline{X} \cdot Y$

The outputs of both AND gates are then connected to an OR gate, which gives:

$$Z = (X \cdot \overline{Y}) + (\overline{X} \cdot Y)$$

This is the standard Boolean expression for the **XOR** operation.

Therefore, the circuit realizes the function:

$$Z = X \oplus Y$$

Answer: (A) XOR