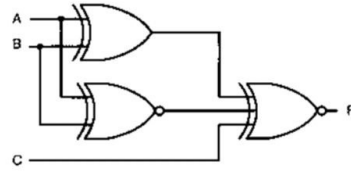


Q.12 For the output F to be 1 in the logic circuit shown, the input combination should be



Options:

- (A) $A = 1, B = 1, C = 0$
- (B) $A = 1, B = 0, C = 0$
- (C) $A = 0, B = 1, C = 0$
- (D) $A = 0, B = 0, C = 1$ **(Correct Answer)**

- The top gate is an OR gate: $A + B$
- The bottom gate is also an OR gate: $A + B$, followed by a NOT gate: $\overline{A + B}$
- The final OR gate has inputs: $\overline{A + B}$ and C
- So, the final output:

$$F = \overline{A + B} + C$$

- To make $F = 1$, either $\overline{A + B} = 1$ or $C = 1$
- $\overline{A + B} = 1$ only when both $A = 0$ and $B = 0$
- So, when $A = 0, B = 0$, then:

$$\overline{A + B} = \overline{0 + 0} = \overline{0} = 1$$

- Then $F = 1 + C = 1$, so for any C , $F = 1$
- Among the options, only option (D) has $A = 0, B = 0$

Therefore, the correct input combination is: (D) $A = 0, B = 0, C = 1$