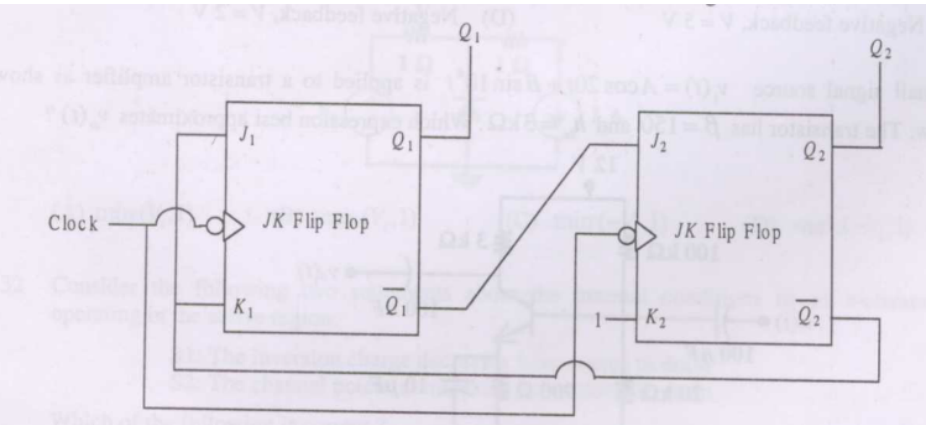
Q39) What are the counting states (Q_1, Q_2) for the counter shown in the figure below?



Options:

(A) 11, 10, 00, 11, 10,...

(B) 01, 10, 11, 00, 01,...

(C) 00, 11, 01, 10, 00,...

(D) 01, 10, 00, 01, 10,...

Answer and Explanation

Answer: (D) 01, 10, 00, 01, 10,...

Explanation:
The circuit consists of two JK flip-flops. Their inputs are connected such that:

- $J_1 = Q_2$, $K_1 = 1$
- $J_2 = \overline{Q_1}$, $K_2 = 1$

Simulating the state transitions starting from $Q_1 = 0, Q_2 = 0$ gives the sequence:

$$00 \rightarrow 01 \rightarrow 10 \rightarrow 00 \rightarrow ...$$

This is a 3-state counter. The correct option that matches this sequence cyclically is option (D).