ANSWER TO GATE EC2012 20TH QUESTION

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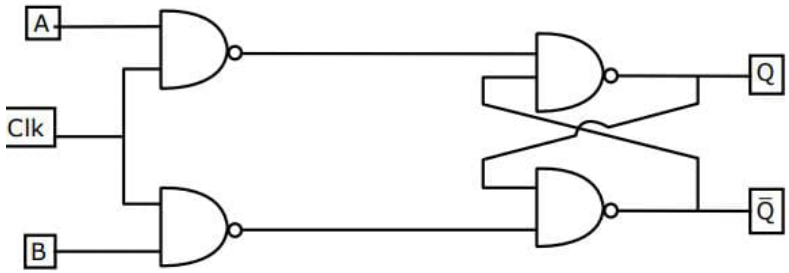
5 JAN , 2021

Problem Statement

Consider the given circuit



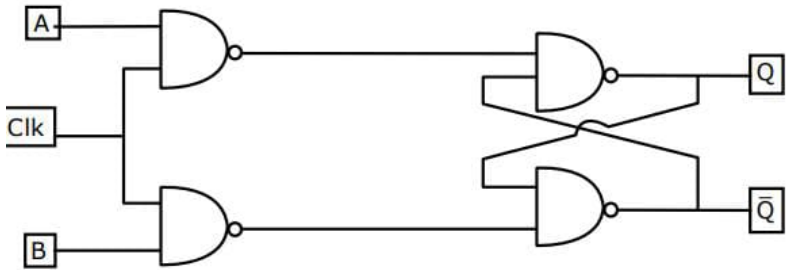
in this circuits, the race around

(A) does not occur

(B) occurs when CLK=0

(C) occurs when CLK=1 and A=B=1

(D) occurs when CLK=1 and A=B=0


A
Clk
B
Q
$\bar{Q}$


GATE

Explanation

$Q_{next} = \overline{\overline{A.CLK}.\overline{Q}}$

$=A.CLK + Q$

$\overline{Q}_{next} = B.CLK + \overline{Q}$

If CLK = 1 and A = B =1

then $Q_{next} = 1$

$\overline{Q}_{next} = 1$

then no race around

If CLK = 1 and A = B =0

then $Q_{next} = Q$

$\overline{Q}_{next} = \overline{Q}$

then no race around

Thus race around does not occur in the circuit

Answer

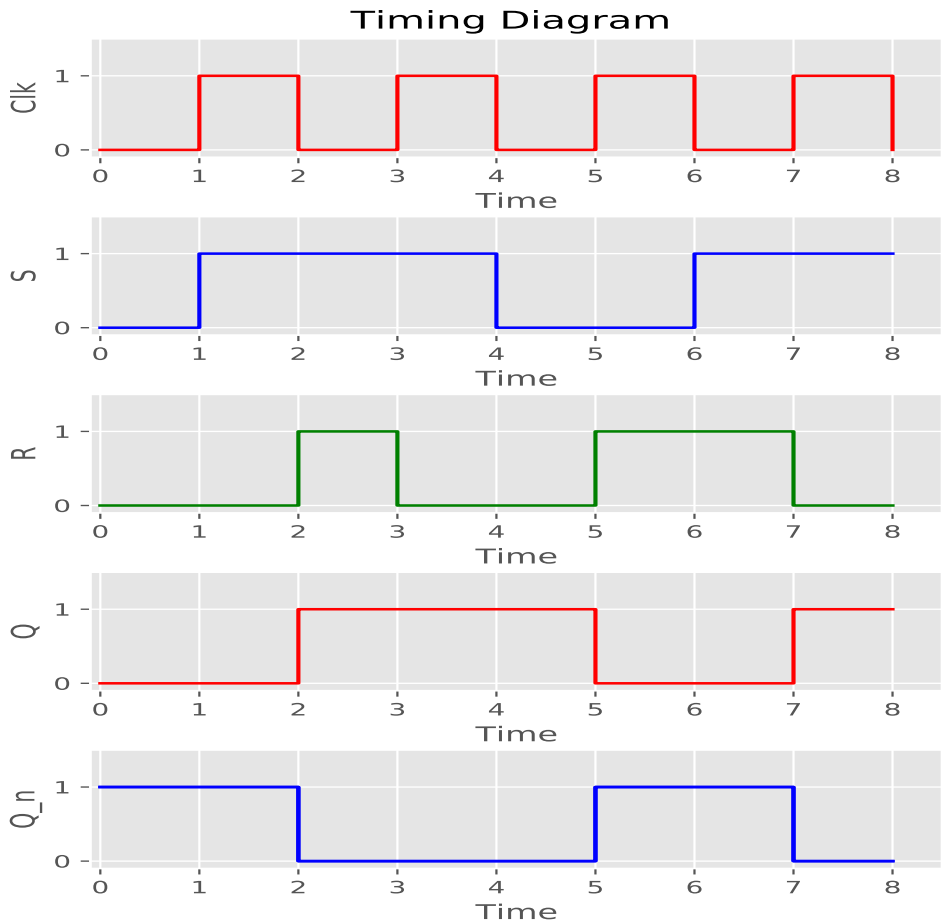
the answer to the given question is (A)

To Be Noted : Race around is applicable only for J-K flip flop when CLK = 1 and A=B=1. But the given circuit is S-R flip flop so no race around occurs.

STATE TRANSITION TABLE

TABLE 1			
Present state(Q)	input(S)	input(R)	Next state(Q_n)
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	X
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	X

TIMING DIAGRAM



THANKYOU