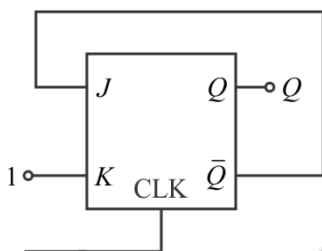


## Subject : Digital Logic

### Chapter: Sequential Circuit

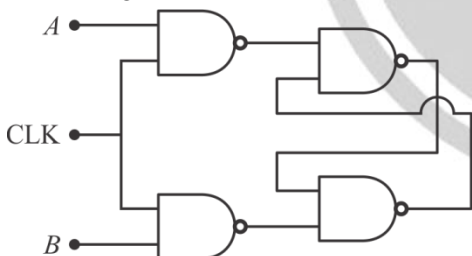
1. Consider the following  $J$ - $K$  flip-flop



In the above  $J$ - $K$  flip-flop,  $J = \bar{Q}$  and  $K = 1$ . Assume that the flip-flop was initially cleared and then clocked for 6 pulses. What is the sequence at the  $Q$  output?

- (a) 010000                      (b) 011001  
(c) 010010                      (d) 010101

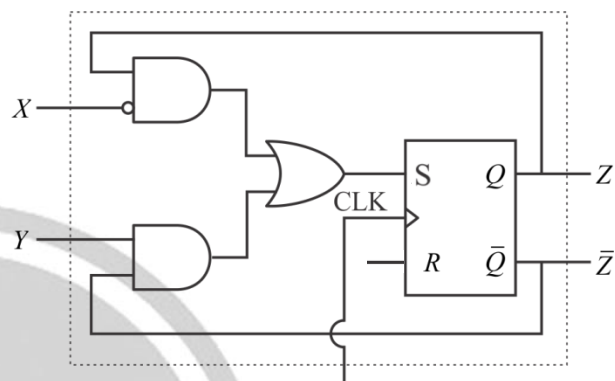
2. Consider the given circuit.



In this circuit, the race around

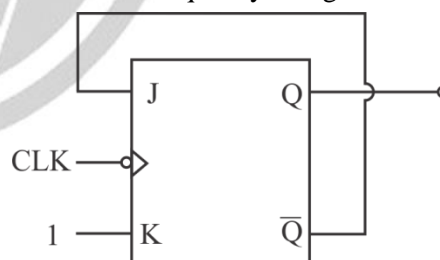
- (a) does not occur.  
(b) occurs when  $\text{CLK} = 0$ .  
(c) occurs when  $\text{CLK} = 1$  and  $A = B = 1$ .  
(d) occurs when  $\text{CLK} = 1$  and  $A = B = 0$ .

3. A sequential circuit using  $D$  Flip-Flop and logic gates is shown in figure, where  $X$  and  $Y$  are the inputs and  $Z$  is the output. The circuit is



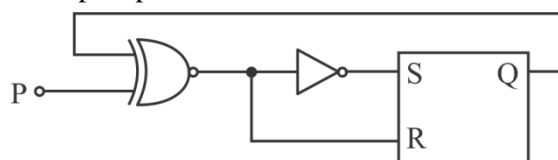
- (a)  $S$ - $R$  Flip-Flop with inputs  $X = R$  and  $Y = S$ .  
(b)  $S$ - $R$  Flip-Flop with inputs  $X = S$  and  $Y = R$ .  
(c)  $J$ - $K$  Flip-Flop with inputs  $X = J$  and  $Y = K$ .  
(d)  $J$ - $K$  Flip-Flop with inputs  $X = K$  and  $Y = J$ .

4. The frequency of the clock signal applied to the negative going edge triggered JK flip flop shown below is 5 kHz. What is frequency of signal available at  $Q$  ?



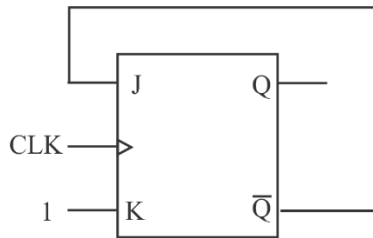
- (a) 2.5 kHz                      (b) 5 kHz  
(c) 10 kHz                      (d) 1.25 kHz

5. The RS flip flop is modified so as to realize a flip flop with single input  $P$ . The characteristic equation of a new flip-flop will be



- (a)  $Q(t+1) = P \oplus Q$   
(b)  $Q(t+1) = \overline{P \oplus Q}$   
(c)  $Q(t+1) = P + Q$   
(d)  $Q(t+1) = P$

6. The J-K FF shown below is initially cleared and then clocked for 5 pulses, the sequence at the  $Q$  output will be



- (a) 010000      (b) 011001

- (c) 010010      (d) 010101
7. For a J-K flip-flop,  $J$  input is tied to its own  $\bar{Q}$  output and its  $K$  input is connected to its own  $Q$  output. If the flip-flop is fed with a clock of frequency 1 MHz, its  $Q$  output frequency (in MHz) will be\_\_\_\_\_.



## Answer Key

1. (d)
2. (a)
3. (d)
4. (a)
5. (a)
6. (d)
7. (0.5)



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