

Course Code: EE-1005	Course Name: Digital Logic Design
Instructor Name: Hamza Ahmed	
Student Roll No:	Section:
Date:	Time:

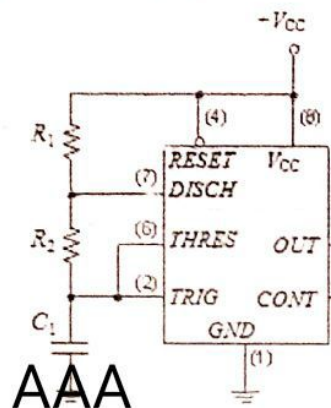
Total Time: 20 min

Max Marks: 15 points

Question # 01:

(05 Marks)

A 555-timer configured to run in the astable mode (oscillator). Determine the frequency of the output and the duty cycle. ($R_1 = 4.5K\Omega$, $R_2 = 2.7K\Omega$ and $C_1 = 43 \text{ pF}$)



$$f = \frac{1.44}{((4.5 \times 10^3) + 2(2.7 \times 10^3)) \times 43 \times 10^{-12}}$$

$$T = \frac{1}{f}$$

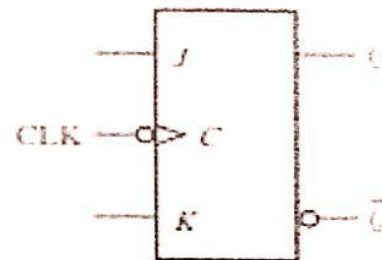
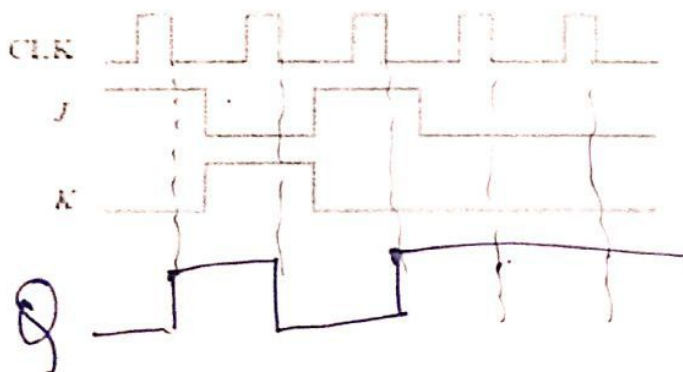
$$t_w = 1.1 \times R_1 \times C_1$$

$$D_C = \frac{t_w}{T}$$

Question # 02

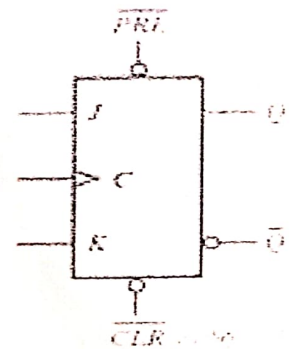
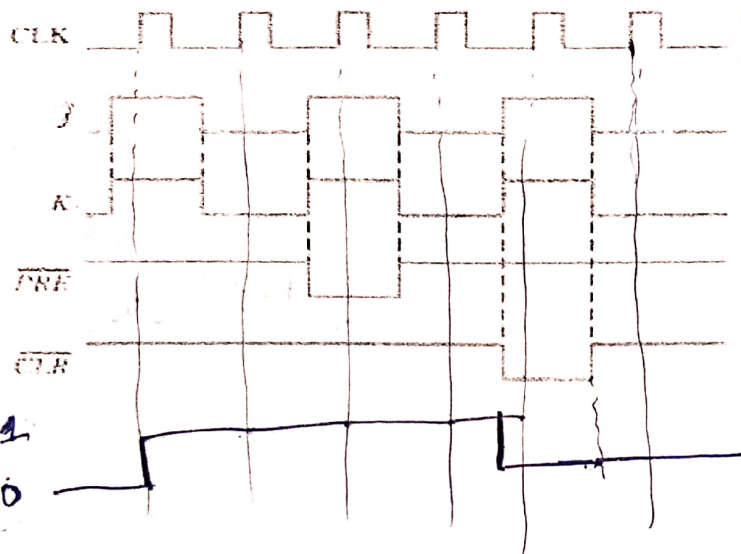
(05 Marks)

An edge-triggered J-K flip-flops are shown in Figure below. If the inputs are as shown, draw the Q output of flip-flop relative to the clock.



Question # 03**(05 Marks)**

Determine the Q waveform relative to the clock if the signals shown in Figure below are applied to the inputs of the J-K flip-flop. Assume that Q is initially LOW.



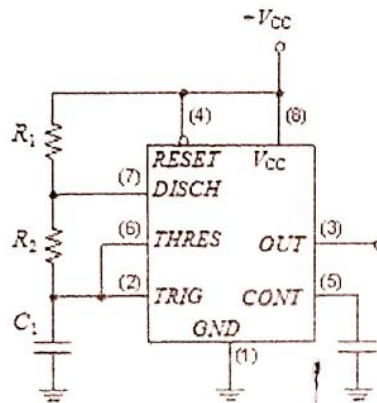
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Question # 01: (05 Marks)

A 555-timer configured to run in the astable mode (oscillator). Determine the frequency of the output and the duty cycle. ($R_1 = 3.5K\Omega$, $R_2 = 4.7K\Omega$ and $C_1 = 0.45 \mu F$)



$$f = \frac{1.44}{(R_1 + 2R_2)C_1} = \frac{1.44}{(3.5 \times 10^3 + 2(4.7 \times 10^3)) \times 0.45 \times 10^{-6}}$$

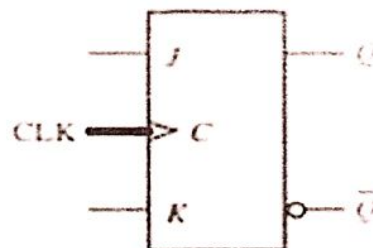
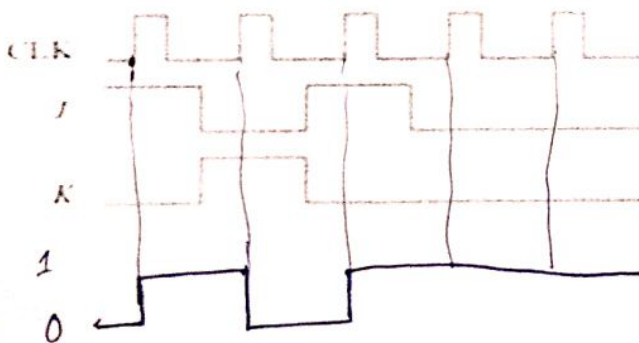
$$T = \frac{1}{f}$$

$$t_w = 1.1 \times R \times C$$

$$D_c = \frac{t_w}{T} \times 100$$

Question # 02: (05 Marks)

An edge-triggered J-K flip-flops are shown in Figure below. If the inputs are as shown, draw the Q output of flip-flop relative to the clock.



Question # 03

(05 Marks)

Determine the Q waveform relative to the clock if the signals shown in Figure below are applied to the inputs of the J-K flip-flop. Assume that Q is initially HIGH.

