# VIT

## Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

# SCHOOL OF INFORMATION TECHNOLOGY AND ENGINEERING

## CAT II – B.Tech. - Winter Semester - 2018-19

Course Name: Digital Logic and Microprocessors

Duration: 1.5 hrs

Course Code: ITE1001

Max. Marks : 50

Slot : A2+TA2

Faculty : Dr. Swarna Priya RM, Dr. Aarthy S L, Dr. Praveen Kumar Reddy

1. Clock, S and R waveforms, and three flip-flops are shown in Figure below. For the flip-flops, carefully sketch the output waveform, $Q_i$, obtained in response to the input waveforms. Assume that the propagation delay of the storage elements is negligible. Initially, all storage elements store 0. **(6 Marks)**
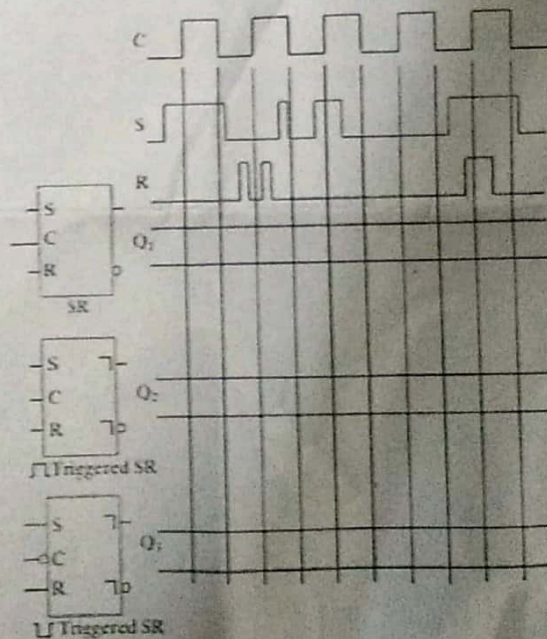


2. Design a switch-tail counter which uses the complement of the serial output of a right shift register (Binary Shift Right) as its serial input.
   (a) Draw the modified shift register circuit as per the specified requirement. **(2 Marks)**
   (b) Starting from an initial state of 000, list the sequence of states after each binary shift until the register returns to 000. **(5 Marks)**
   (c) Draw the timing diagram for the same. **(5 Marks)**

3. Design an asynchronous sequential circuit using JK Flip Flop for the following state diagram. (12 Marks )
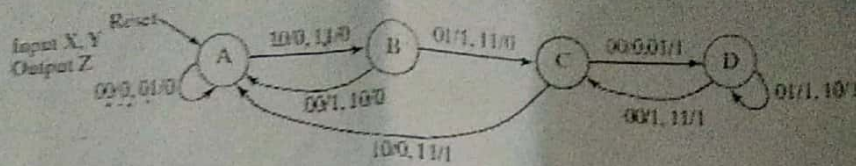


4. Identify the machine cycles for the following instructions and also the status and control signals associated with each instruction during the execution by the microprocessor 8085. (10 Marks)

> MVI A, #8FH
>
> ADI #72H
>
> OUT 01H
>
> HLT

5. Calculate the execution time for each Machine cycle and the instruction if the clock frequency f=3 MHz. (10 Marks)

   i)    MVI B, #08H
   ii)   LDA 3065H
   iii)  IN 02H
   iv)   INR 1009H
   v)    INR B

****ALL THE BEST****

So, $\dfrac{t(t+1)}{2} \geq n$

$2n \geq t^2 \pm)$

$S_2\ 1, 3, 7,$    $\to$    $t^2 \geq \sqrt{2n-1}$

Order $\geq \sqrt{n}$

$S = 1, 3, 6, \ldots 10, \ldots n$

$1^{st}$ term $1$      $S = \dfrac{1, 3, 6, \ldots 10, \ldots n}{+2 \ +3 \ +4 \ \ldots +x}$

$2^{nd}$ term $1+2$

$3^{rd}$ term $1+2+3$

$4^{th}$ term, $1+2+3+4$

$9^{th}$ term $1+2$

$8^{th}$ term

$2+3+4+5 \ldots + t$