CLASS: S.E. 5 E &TC **SUBJECT: DC**

EXPT. NO.: 9 **DATE: 07/12/2020**

Roll No: 22119

TITLE : SHIFT REGISTER

PRE-REQUISITES FOR EXPT. : Definition of register, Implementation and operation of Shift-Register using IC-74HC194.Different modes of Shift-Register. Universal Shift-Register. Application of IC-74HC194. (Refer Data-Sheet)

OBJECTIVE :

1. Functional verification of shift registers IC 74HC194
2. Design and Implement Pulse train generator using IC-74HC194 (Use right shift).
   (Sequence:)
3. Design and Implement Pulse train generator using IC-74HC194 (Use left shift).
   (Sequence:)
4. Design and Implement 4-bit Ring Counter.
5. Design and Implement 4-bit Twisted ring Counter.
6. Verify different modes of operations SISO, PISO, PIPO, SIPO (IC 74HC194).

APPARATUS :

Digital-Board, GP-4Patch-Cords, IC-74LS32, IC-74LS00 / IC-74LS04/IC-74LS08, IC74HC194.

THEORY :

Register is a sequential logic device, which can be used to store the number of bits. Register whose internal bits can be shifted towards right and left is called as shift register. IC-74HC194 is a bi-directional universal shift

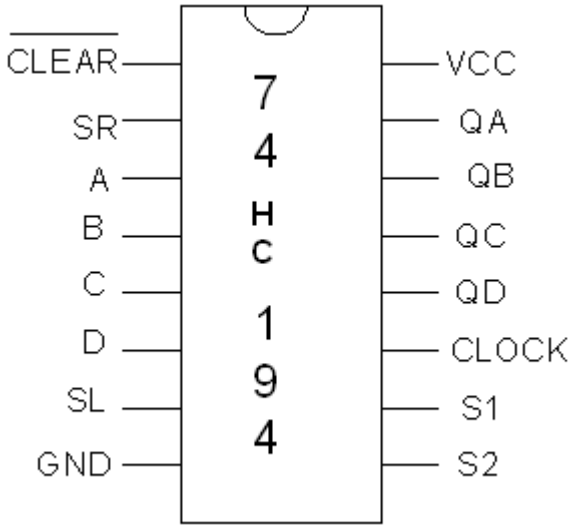
register. This is called universal shift register because it performs all modes of operations of shift register.

IC-74HC194 provides four different modes of operation:

1) Serial in Serial Out. SISO
2) Serial in Parallel out SIPO
3) Parallel In Serial out PISO.
4) Parallel in Parallel out PIPO.

IC-74HC194 can be used to implement pulse train generator, ring counter, twisted ring counter.

PIN Diagram:



PROCEDURE :

1. Make the connections and verify IC truth table.
2. Make the connections as per the Logic circuit of pulse train generator using right shift.
3. Make the connections as per the Logic circuit of pulse train generator using left shift.
4. Make the connections as per the Logic circuit of ring counter
5. Make the connections as per the Logic circuit of twisted ring counter.
6. Draw all timing diagrams.

Pulse train generator using Shift Right

TRUTH-TABLE:

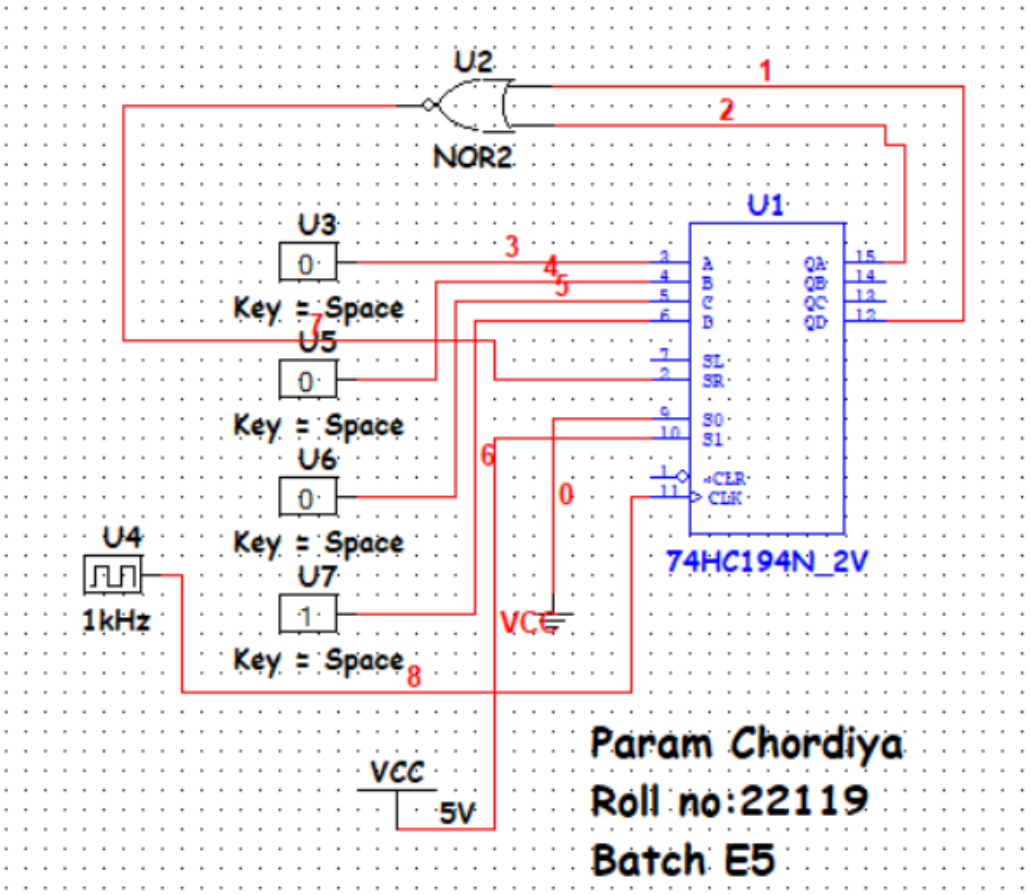
Output				Decimal Equivalent	O/P Y
Q_A	Q_B	Q_c	Q_D		
1	0	0	1	9	0
0	0	1	0	2	1
0	1	0	1	5	0
1	0	1	0	10	0
0	1	0	0	4	1

K-Map for O/P Y

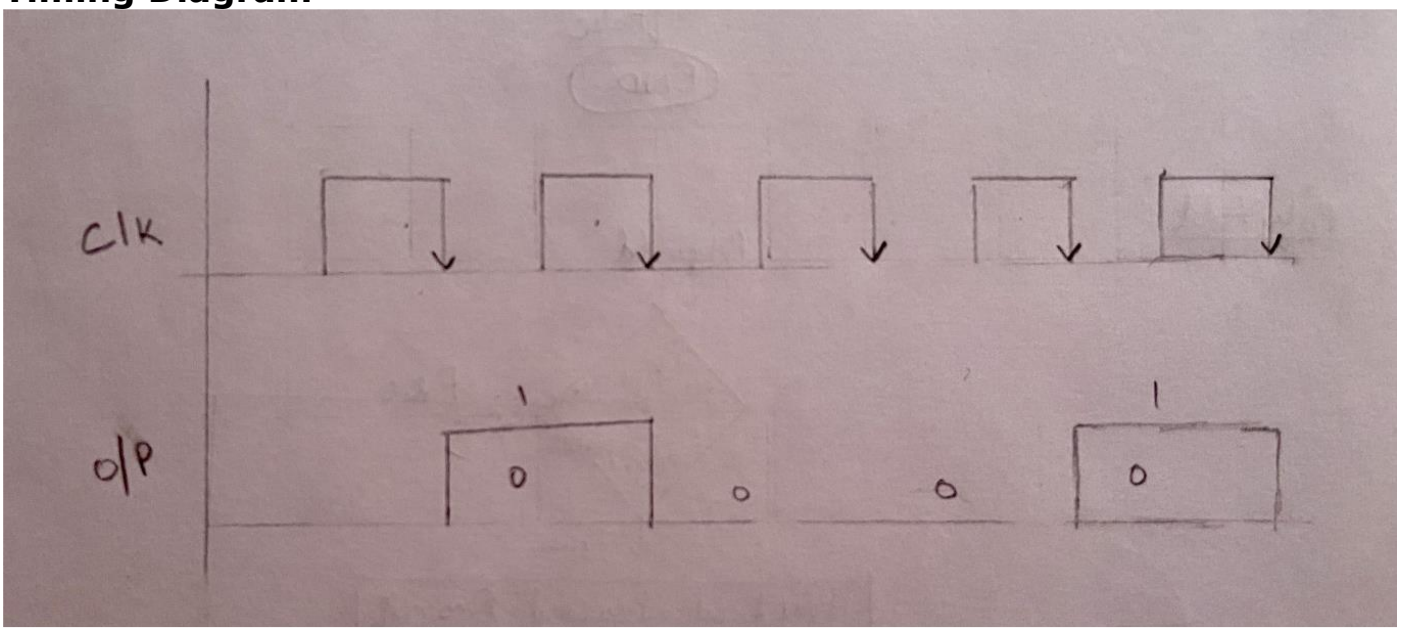
	00	01	11	10
00	x	x	x	1
01	1	0	x	x
11	x	x	x	x
10	x	0	x	0

Y=Qa'.Qb'

Logic Diagram



Timing Diagram

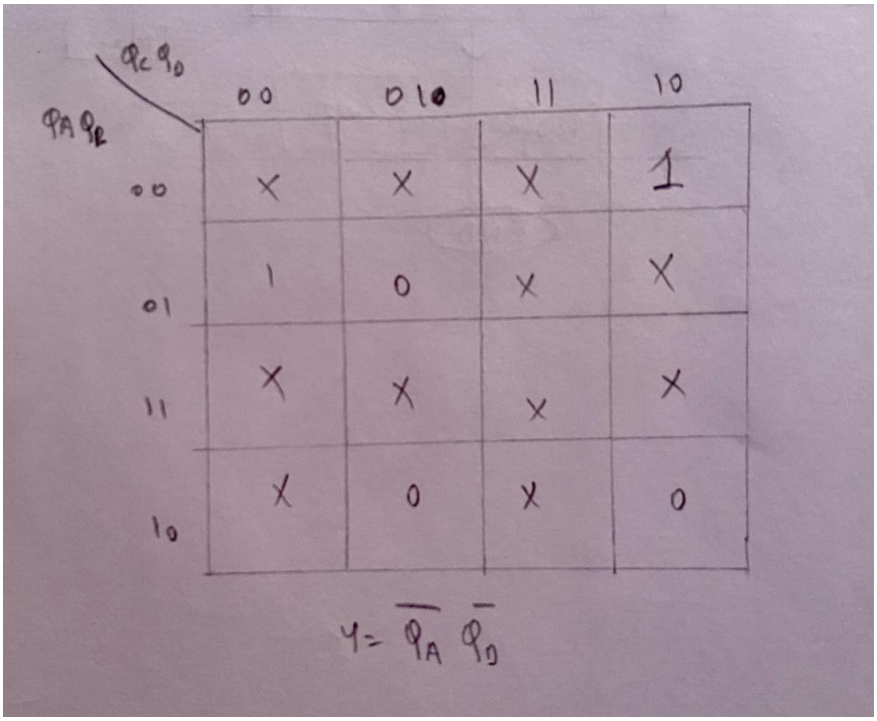


Pulse train generator using Shift Left

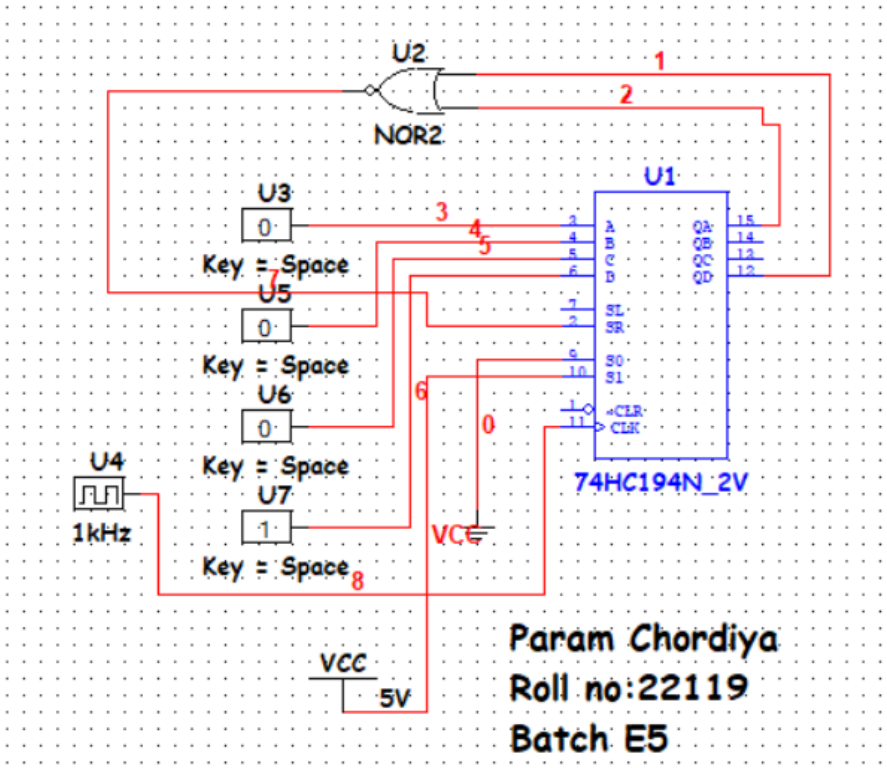
TRUTH-TABLE:

Output				Decimal Equivalent	O/P Y
Q_A	Q_B	Q_c	Q_D		
1	0	0	1	9	0
0	0	1	0	2	1
0	1	0	1	5	0
1	0	1	0	10	0
0	1	0	0	4	1

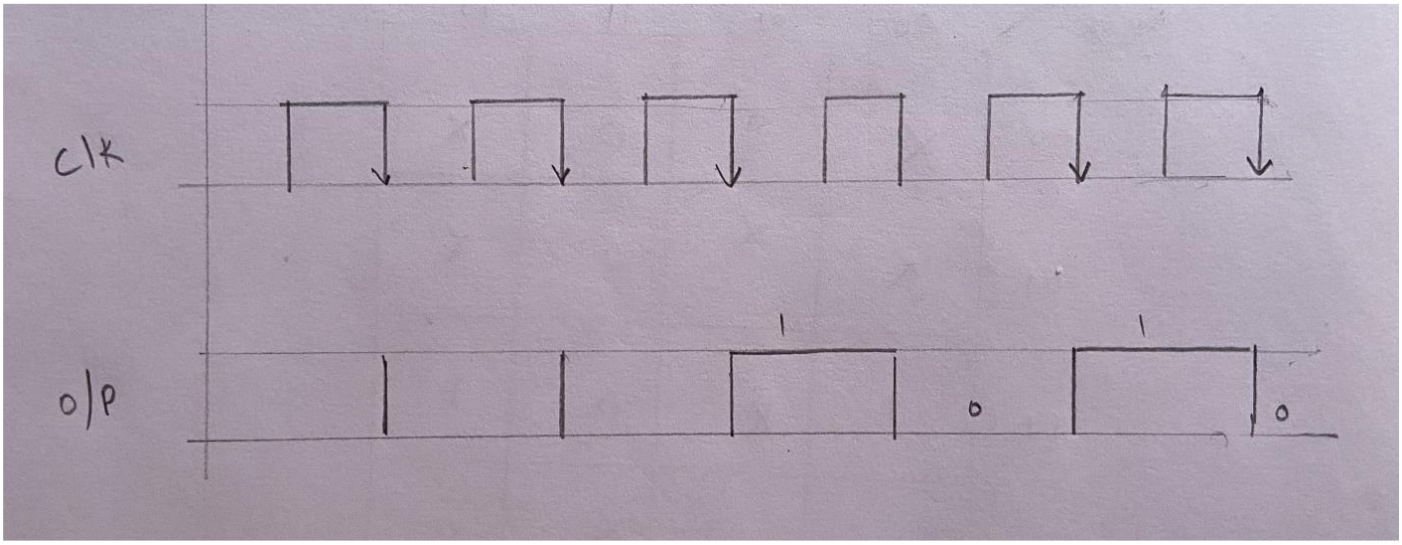
K-Map for O/P Y



Logic Diagram



Timing diagram

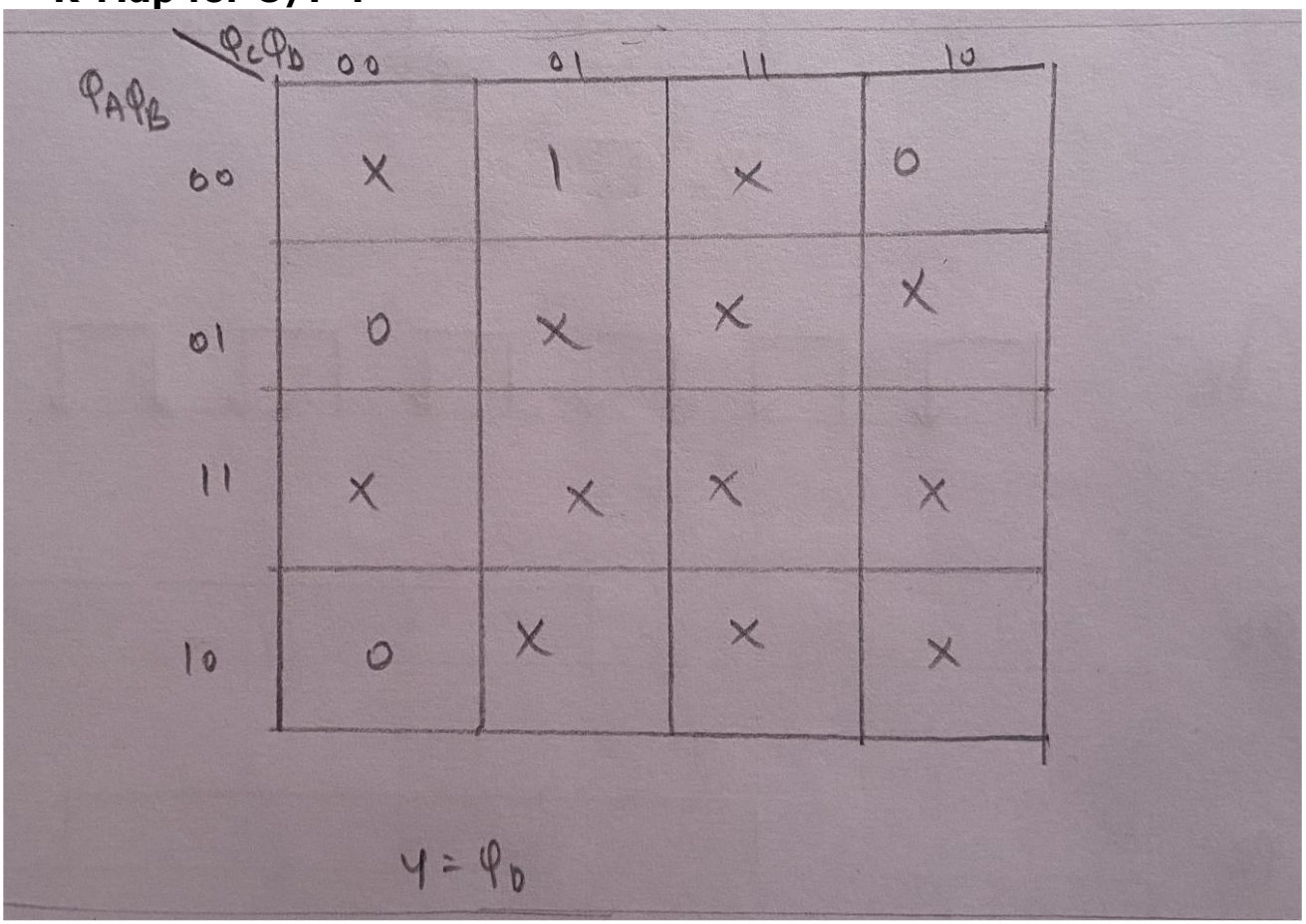


Design of 4-bit Ring Counter:

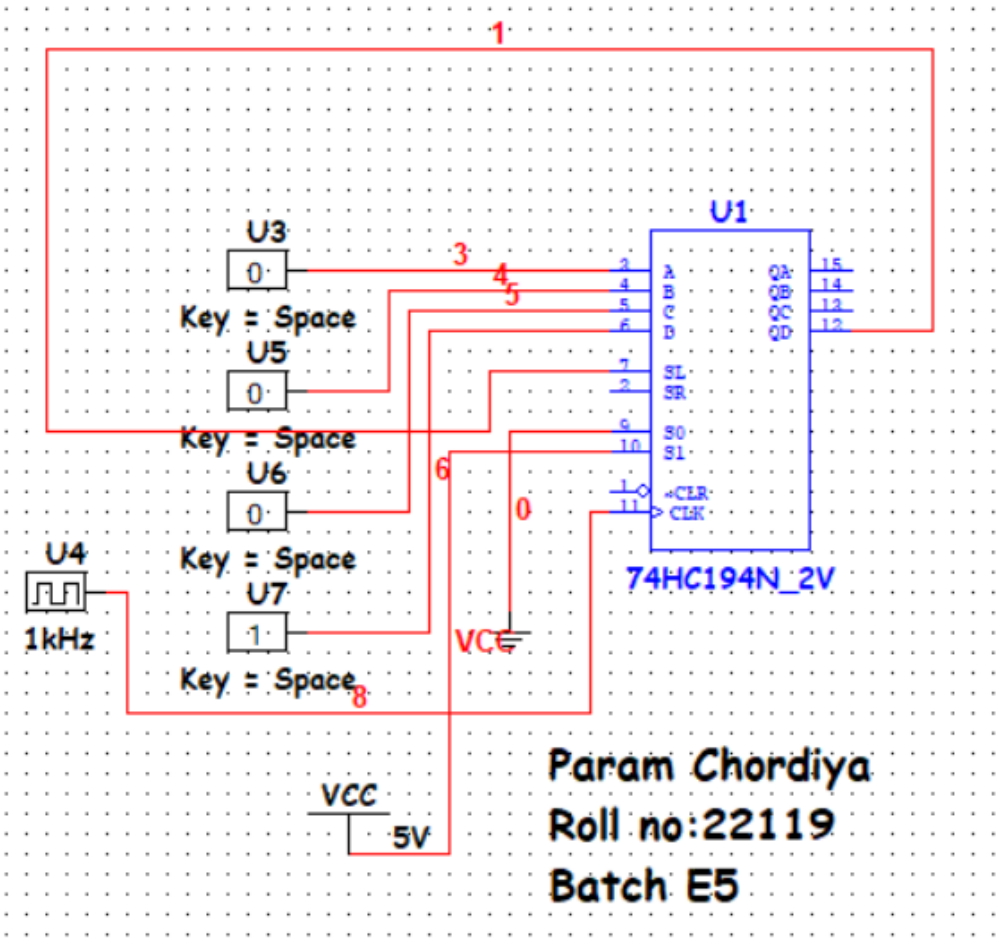
TRUTH-TABLE:

Output				Decimal Equivalent	O/P Y
Q_A	Q_B	Q_c	Q_D		
0	0	0	1	1	1
0	0	1	0	2	0
0	1	0	0	4	0
1	0	0	0	8	0

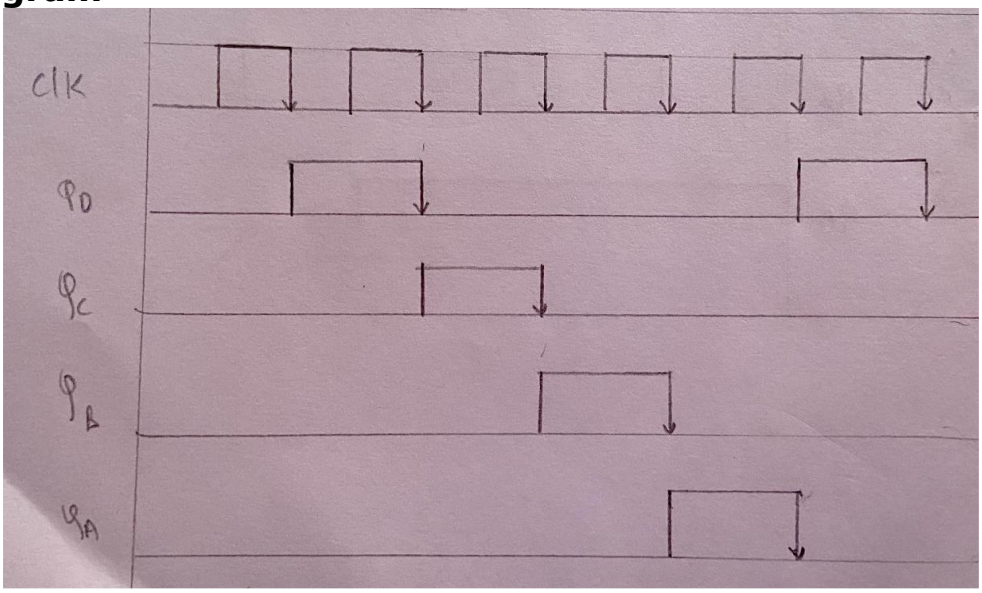
K-Map for O/P Y



Logic Diagram



Timing Diagram

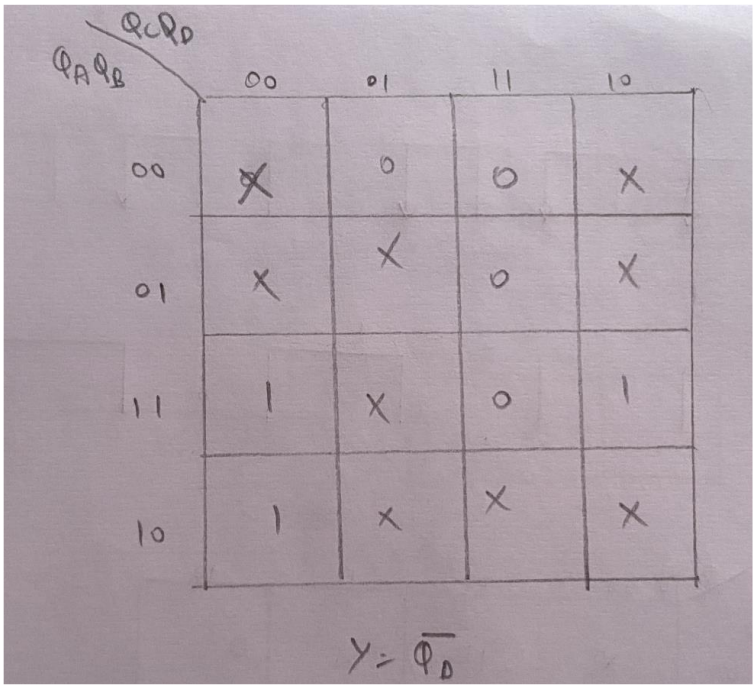


Design of 4-bit Twisted Ring Counter

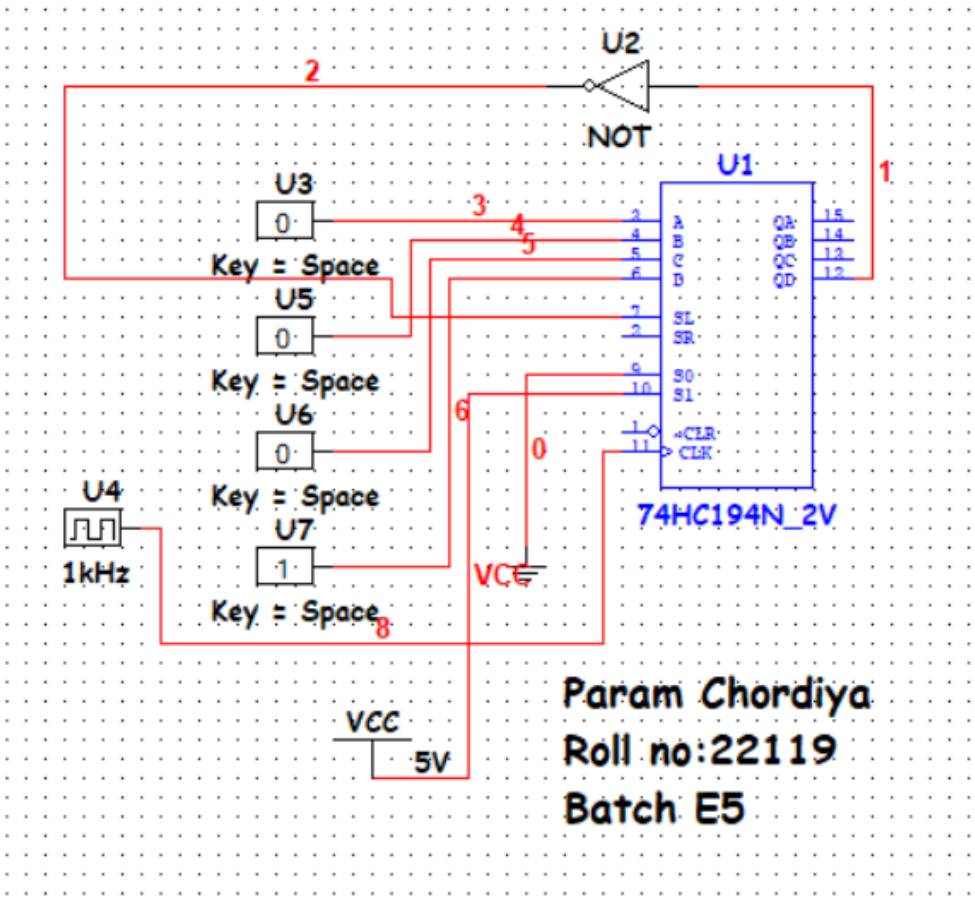
TRUTH-TABLE:

Output				Decimal Equivalent	O/P Y
Q_A	Q_B	Q_c	Q_D		
0	0	0	1	1	0
0	0	1	1	3	0
0	1	1	1	7	0
1	1	1	1	15	0
1	1	1	0	14	1
1	1	0	0	12	1
1	0	0	0	8	1

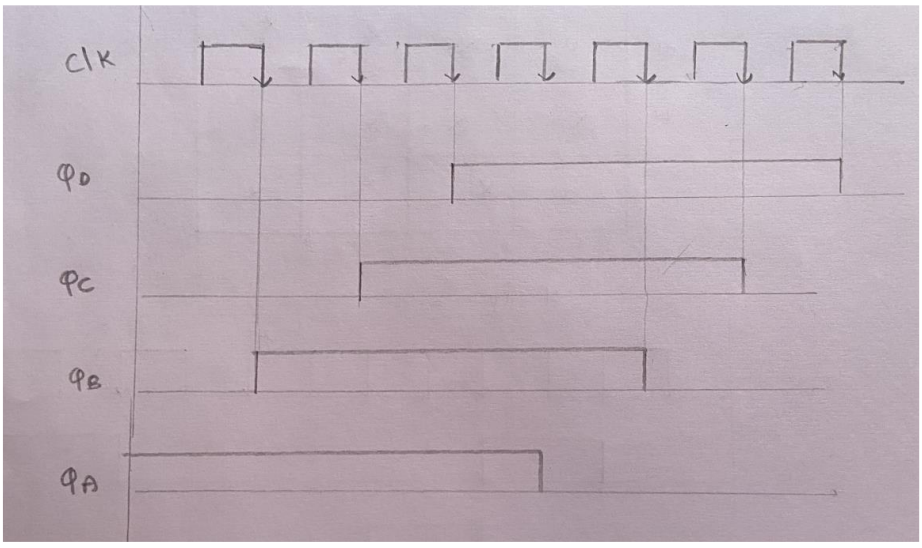
K-Map for O/P Y



Logic Diagram



Timing Diagram



CONCLUSION:

By conducting this experiment we saw how the IC 74HC194 functions. This IC can act as right shift as well as left shift, thus it is called bi-directional shift register. This IC can act as pulse train generator with LS and RS. Also, this IC can be used as a ring counter and twisted pair counter

REFFRENCE:

1) : R.P. Jain , "Modern digital electronics" , 3rd edition

2) : A. Anand Kumar, "Fundamentals of digital circuits" 1st edition

Subject teacher Sign with Date Remark