

Inputs		outputs	
A	B	Σ	Co
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Truth Table:

✓ ✓ ✓ ✓

5-oct-23

Electronics - II (CIT- 244)

Thursday

Practical # 01

To construct Half adder circuit and verify its logic operation.

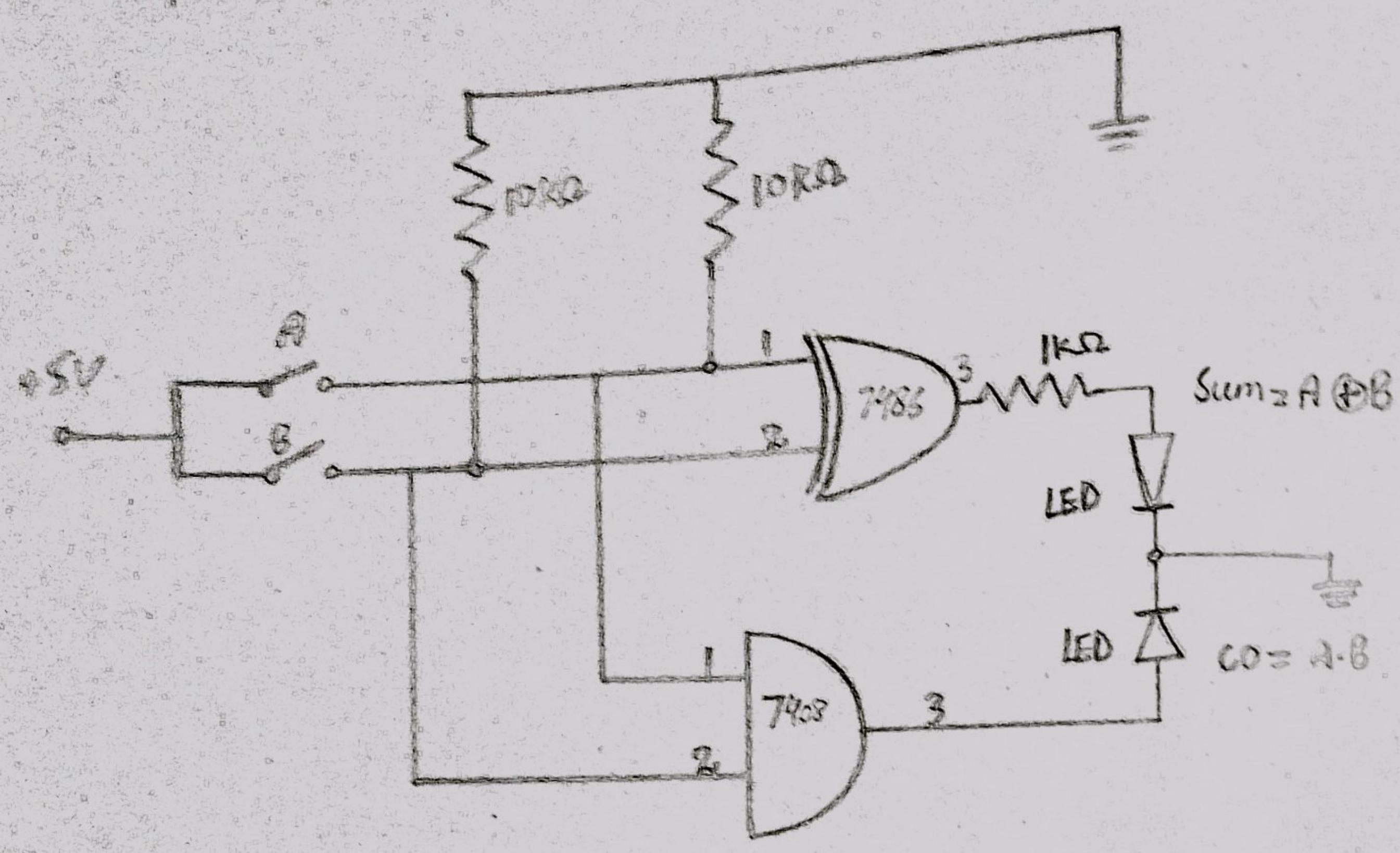
material Required:- Bread Board, LED's, connecting wires, Toolkit, DMM, IC = 7486, 7408. Resistors $1\text{ k}\Omega$, $10\text{ k}\Omega$ (2 nos), Logic Trainer, DC supply.

procedure :-

1. By keeping power supply OFF assemble the circuit as shown in fig.
2. put switch 'A' and 'B' at open position and observe the outputs. Sum and Co LED will remain OFF indicating sum and Co both low.
3. Apply logic high (1) at input 'B' by putting switch 'B' at close position and observe the output. Sum LED will come ON and Co LED will remain OFF. It indicates $0+1=1$.

4. Now apply logic high (1) at input A by closing switch 'A' and logic low (0) at input 'B' by opening switch 'B'. Observe the output sum. LED will remain ON and Co LED will remain OFF. It means $1+0=1$.

5. Now apply logic high (1) at both inputs by closing both switches (A, B). Observe the



Circuit Diagram

output. sum LED will goes OFF while CO LED will comes ON which indicate $1+1=10$ (sum of 0 with carry off 1).

6. write down your observations neatly in notebook.

Precautions :-

1. Use regulated DC Supply.
2. Handle the IC, carefully.

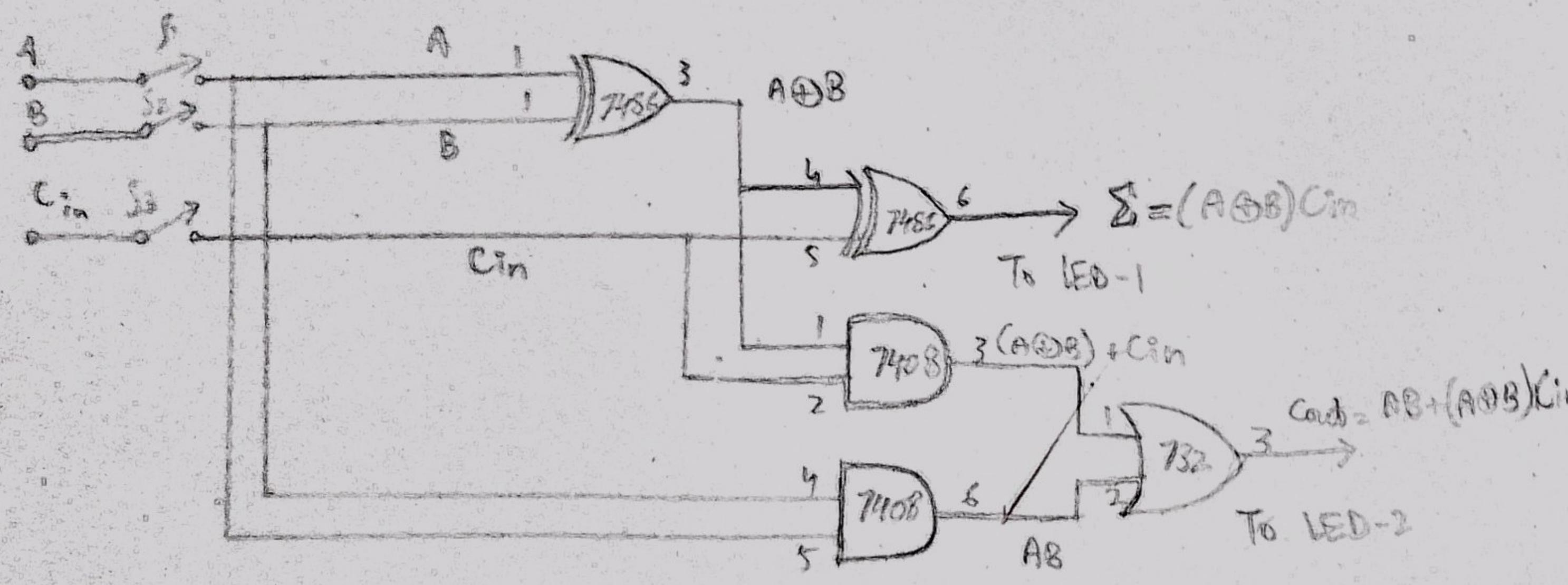
(a) Logic symbol



(b) Truth Table

A	B	Cin	Co	Σ
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

input
carry



(c) logic

Diagram

19.oct.23

Electronics - II (EIT-244)

Practical # 2

Binary Full Adder

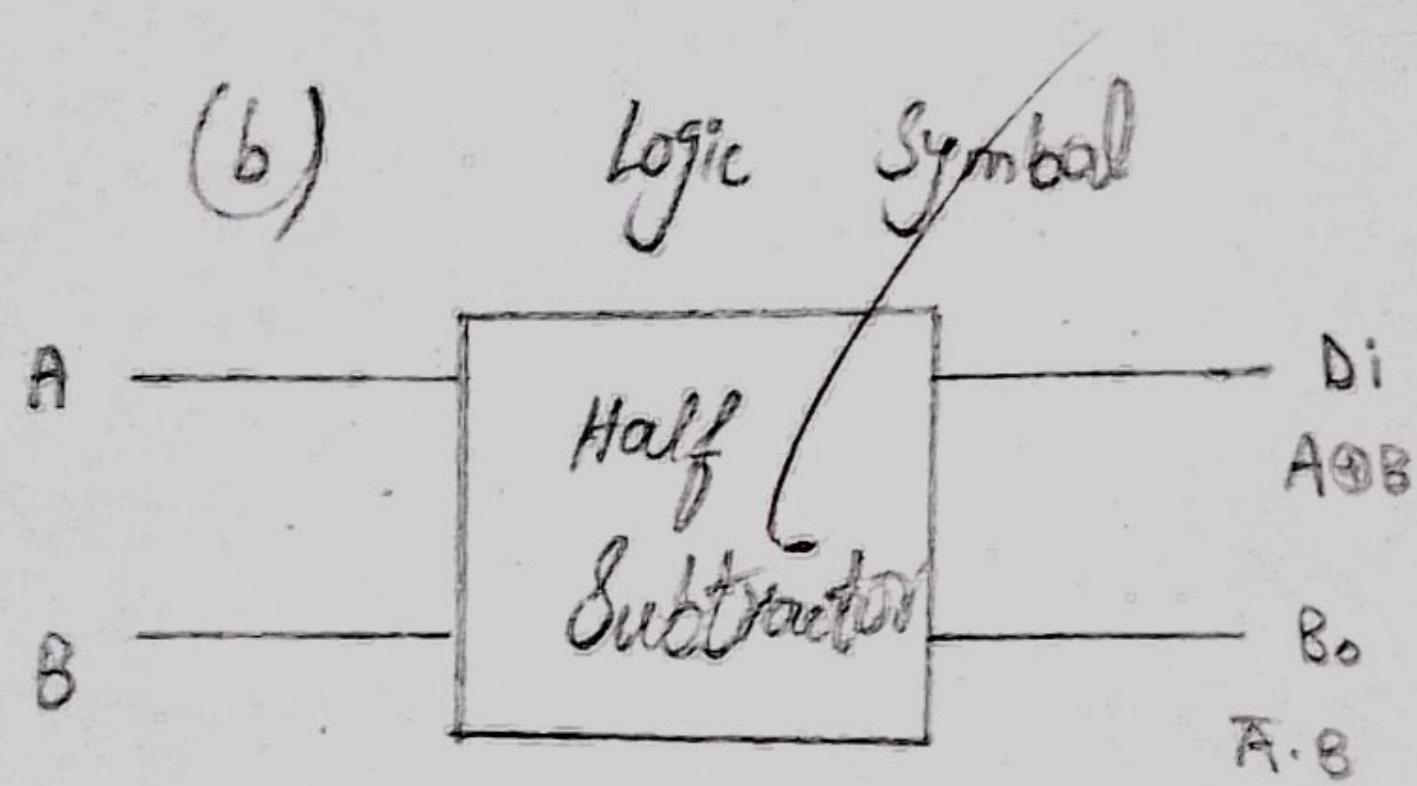
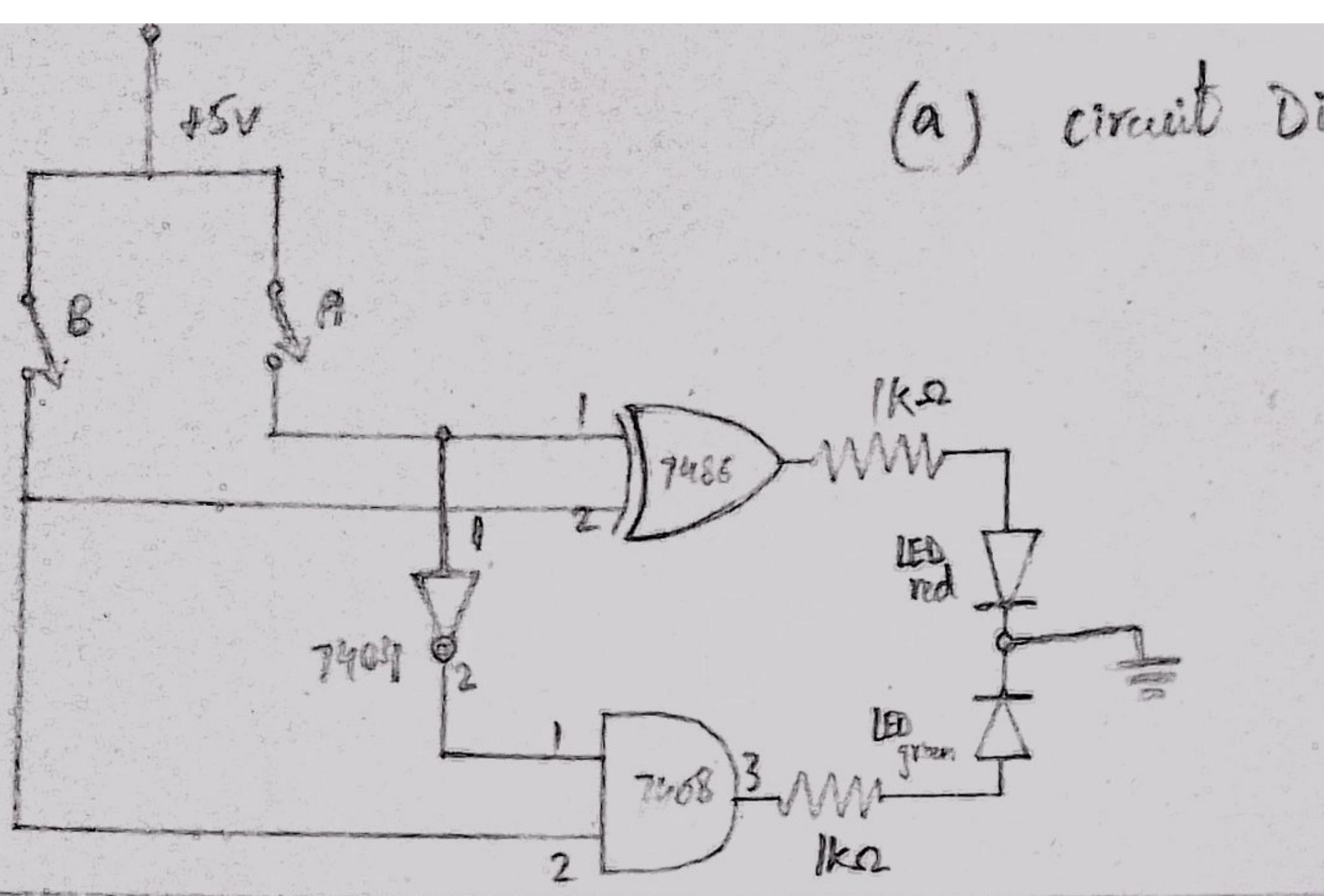
material :- Breadboard, DC supply, 2 LED, 2 $1k\Omega$ resistor, IC (7408, 7486, 7432), 2 switch, DMM, Toolkit, connecting wires

Procedure :-

1. By keeping power supply 'OFF' assemble the circuit.
2. keep all three input switches (S_1, S_2, S_3) open and switch on the power supply. Observe the output LEDs. Both the LEDs will remain OFF indicating sum = 0 and cout = 0.
3. Close switch S_3 and observe the output. LED 1 will glow and LED 2 will remain OFF indicating $\text{Sum} = 1$ and $\text{cout} = 0$.
4. Verify all states as per truth-table. Draw neat diagram of circuit and complete truth-table.

Precautions :-

1. Use regulated DC supply.
2. Handle ICs carefully.
3. Avoid short circuiting.



Truthtable

Inputs		Outputs	
A	B	D _i	B _o
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

~~3f 6 10 27~~

19-oct-23 Electronics - II (CIT-244) Thursday

Practical # 3 (Study of Binary Subtractor)

Materials:

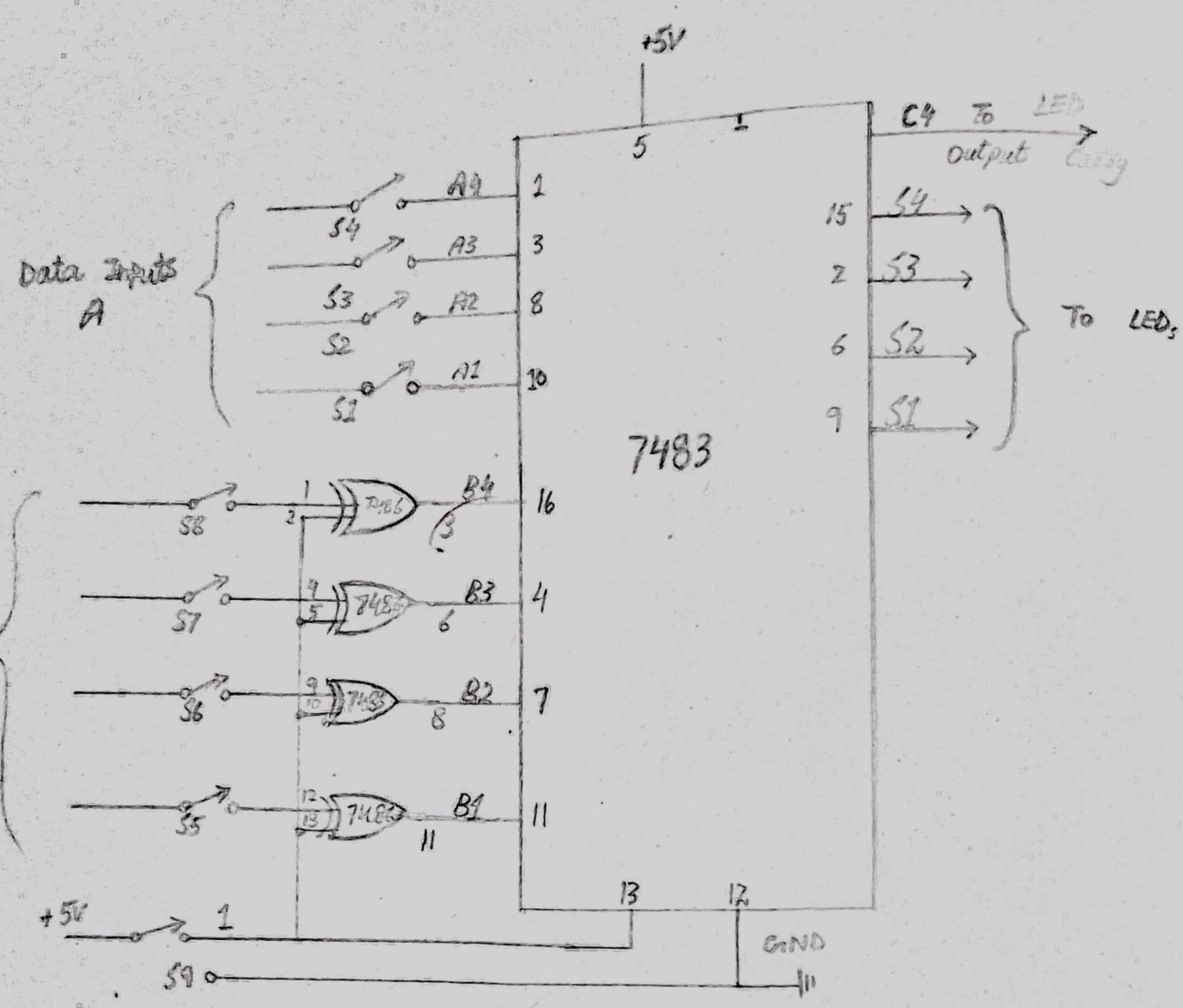
Breadboard, DC supply, DMM, ICs (7486, 7408, 7404), LED (green, red), 2 1kΩ resistor, 2 switch (SPST), Toolkit, connecting wires.

Procedure:

1. By keeping power supply OFF assemble the circuit.
2. Put switch 'A' and 'B' at open position and Switch ON power supply. Observe the output. Both LEDs will remain OFF showing D_i and B_o outputs low (0-0=0).
3. Close switch 'B' to apply logic -1 at input B, observe the outputs. Both LEDs will come ON showing D_i and B_o high. (0-1 = one with B)
4. Open switch 'B' and close 'A' observe outputs.
5. Repeat above steps 2 to 5 and write down your observations.

Precautions:

1. Use regulated supply.
2. Take care ICs pins.
3. Avoid short circuiting.



(Binary adder/Subtractor)

✓
✓
✓
✓

2-Nov-23 Electronics - II (CIT-244)

Thursday

Practical # 4

(Binary adder / Subtractor)

Materials :-

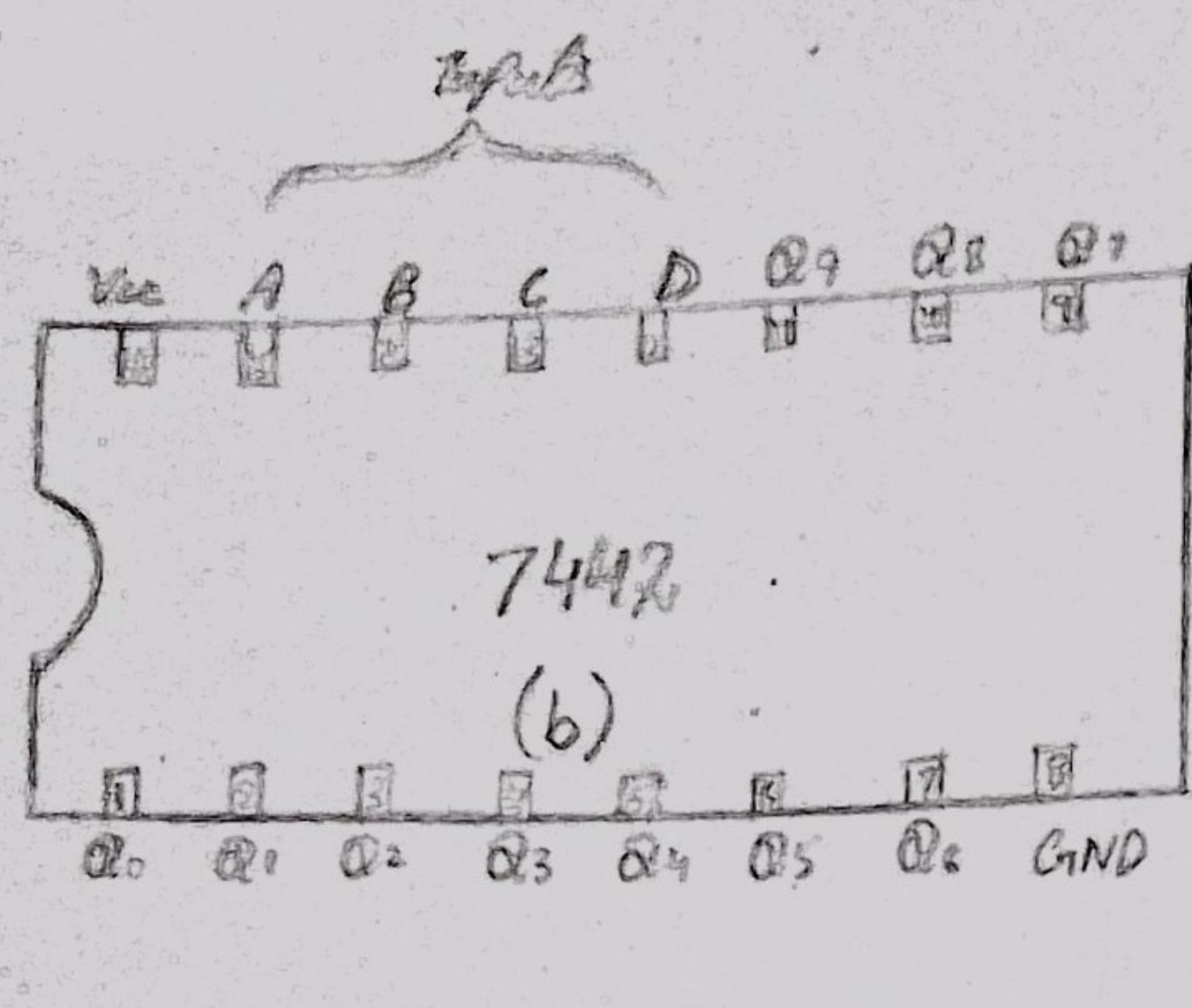
logic trainer, IC (7483, 7486), DMM, connecting wires, tools kit

Procedure :-

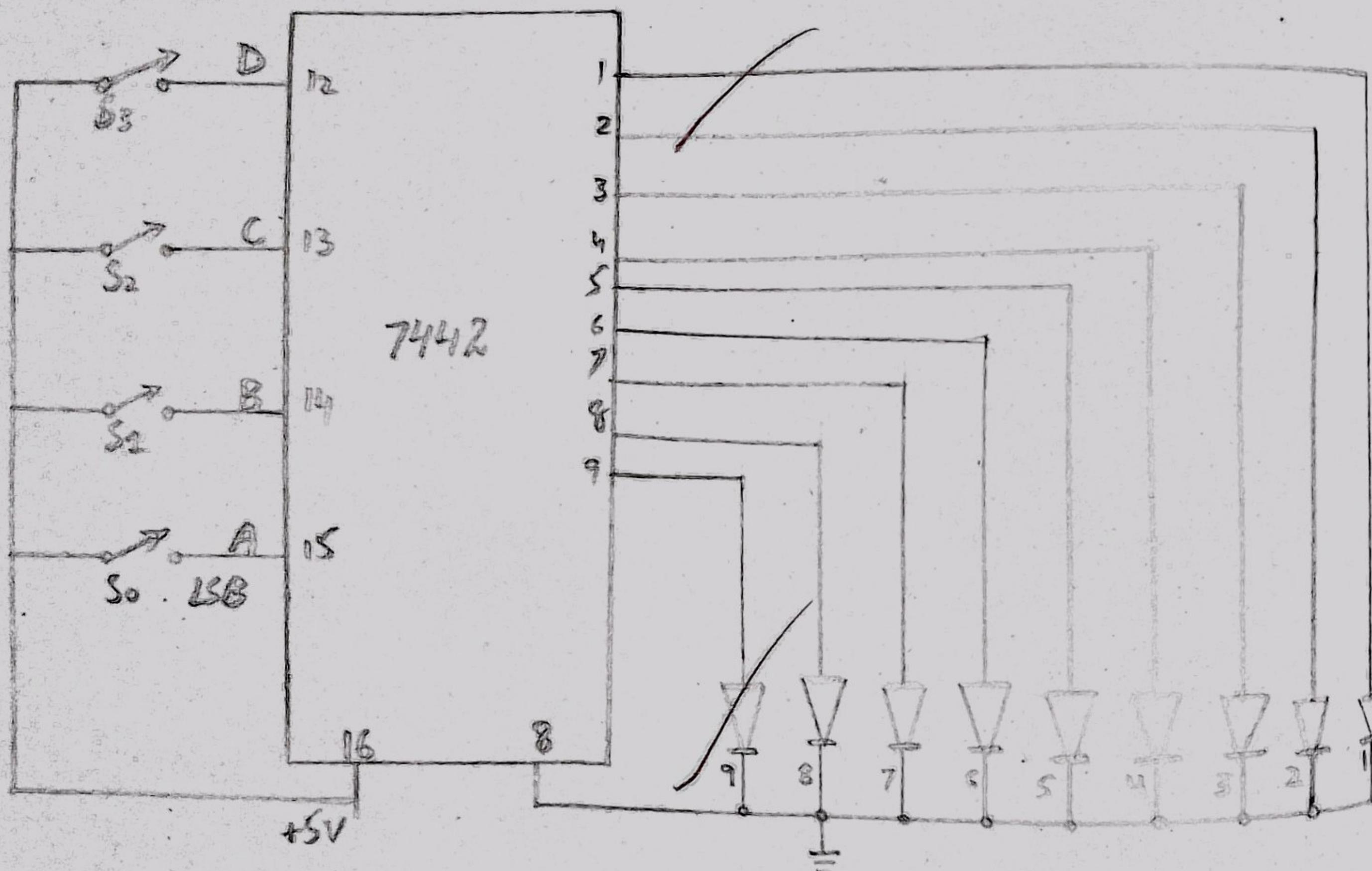
1. Assemble the circuit as shown in diagram.
2. Select mode by S9. For addition put S9 at position 1 and for subtraction at position 2.
3. Select data binary numbers required for input A by switches S1 to S4.
4. Select data for input B by switches S5 to S8.
5. Observe / note output and verify.
6. Verify one by one both modes (addition & subtraction).
7. Repeat above steps for various different data inputs.
8. Draw neat diagram and write your observations in your note book.

Precautions :-

1. Handle the IC carefully.
2. Use regulated DC supply.
3. Ensure tight connections.



Pin Diagram



Circuit Diagram

17 November 23

Electronics - II (CIT-244)

Friday

Practical # 5 (BCD To Decimal Conversion)

Materials :-

Logic trainer, IC 7442, Tools kit, DMM, connecting wires & notebook.

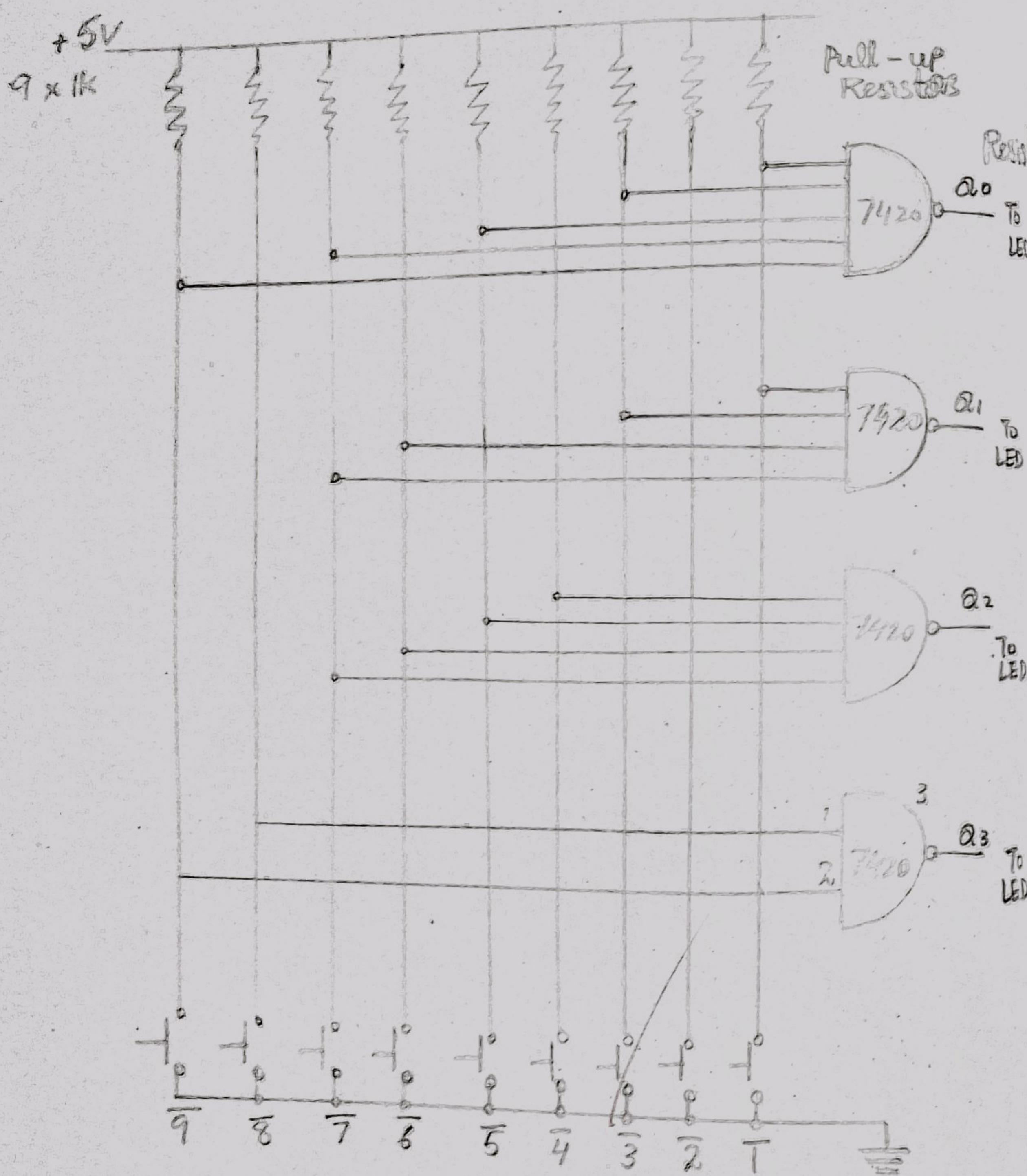
Procedure :-

1. Assemble the circuit as shown.
2. By putting all switches open, switch on the circuit.
3. Observe LEDs. As the input BCD code is, 0000, no LED will come ON.
4. Close the switch S_1 . LED number '1' will comes ON indicating decimal number '1', equivalent to BCD code 0001.
5. Apply all the input combinations of BCD as per truth table one - by - one. Record your observations in the note book.

Precautions :-

1. Identify IC pins carefully.
2. Use regulated DC supply.

(A) Simple decimal to BCD Encoder



~~3/2/11~~

19-nov-23

Electronics - II (CIT-244)

Sunday

Practical # 6

(Decimal to BCD conversion)

material :-

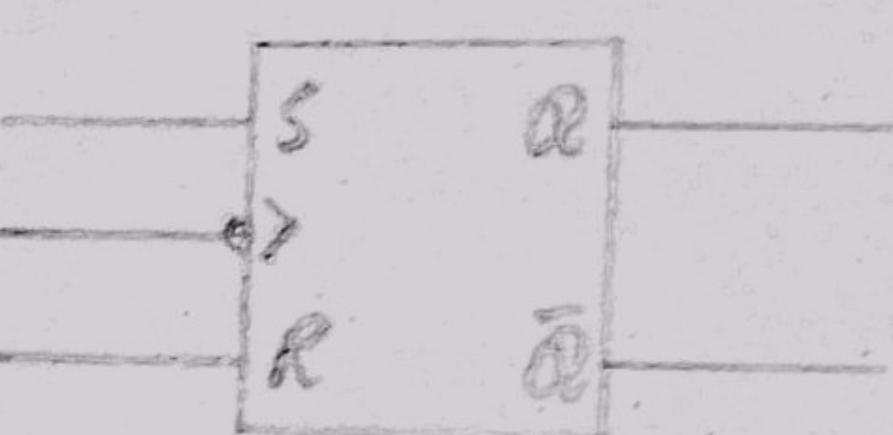
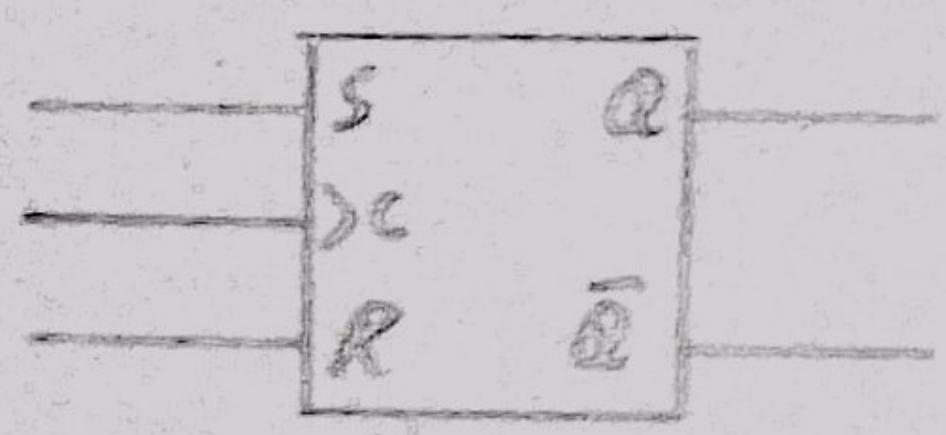
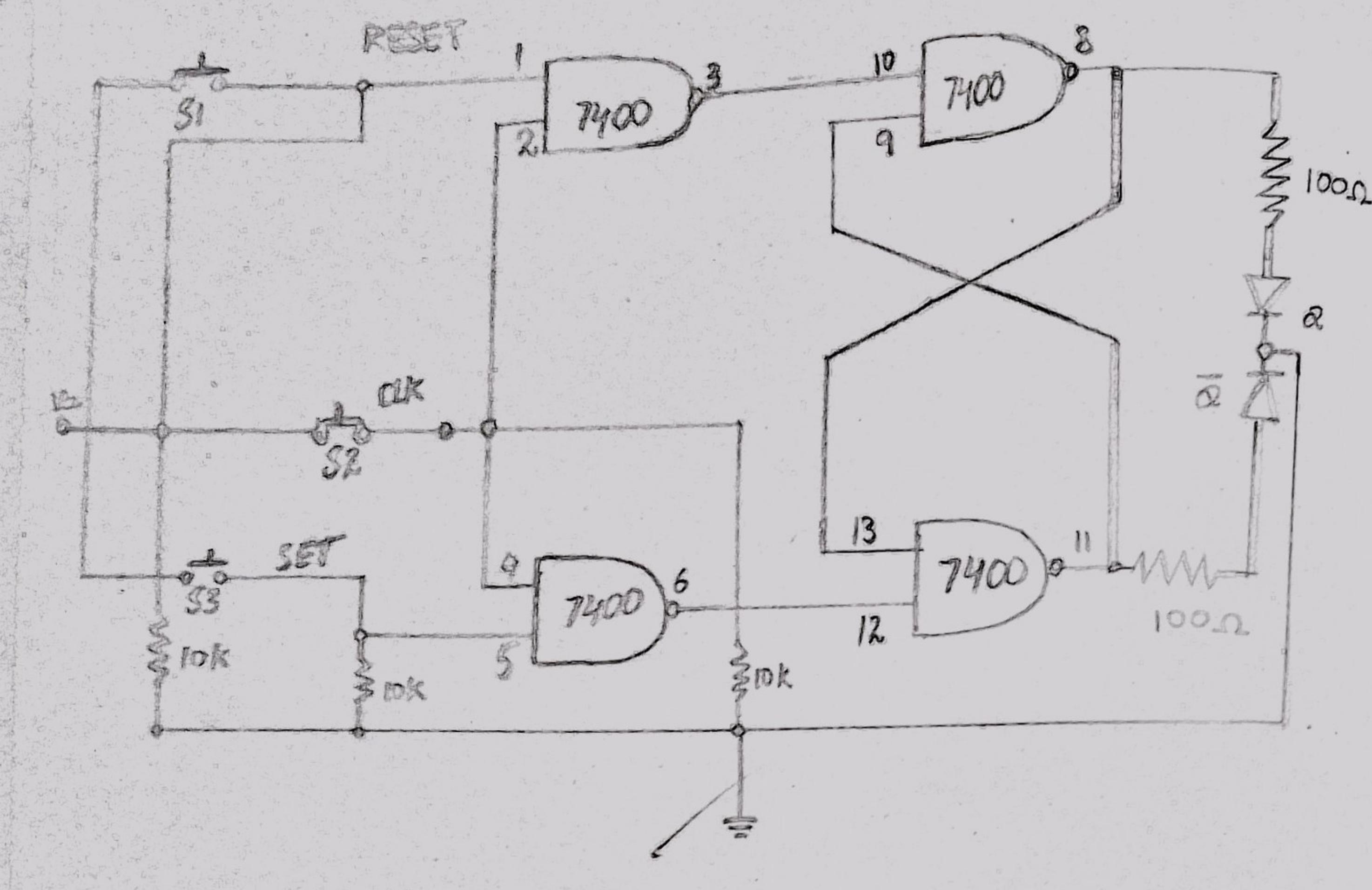
logic trainer, IC-74LS147, 7404, 7400, 7420, 3PST switch, 10K Ω , 2K Ω resistors, key-pad, tools-kit, DMM, connecting wires as required.

procedure :-

1. Assemble the circuit as shown.
 2. Switch ON the power supply and close switch 1. Observe the output LED. LED Q0 will glow while other three LEDs (Q1, Q2, Q3) will not glow indicating BCD code 0001. BCD 0001 is equivalent to decimal 1.
 3. Open switch 1 and close switch 2. Observe O/P LED. Only LED Q1 will glow indicating BCD output 0010. It is decimal number 2.
 4. Go through (step-by-step) upto decimal number 9 (switch 9) and observe O/P BCD code.
- (B) 74LS147 Encoder: It is a 10-to-4 line encoder. It provides same function as described in simple decimal to BCD encoder.
- It is prior encoder.

precautions:-

1. Use regulated DC supply.
2. Handle IC, carefully.
3. Ensure tight connections.



(a)

(b)

Inputs		Output		Remarks
S	R	Q	Q̄	
0	0	Q ₀	Q̄ ₀	NC
0	1	?	?	Reset
1	1	?	?	Set
1	1	?	?	Invalid

7-12-23

Electronics - II
Practical NO :- 7
Thursday

Study of clocked SRFF)

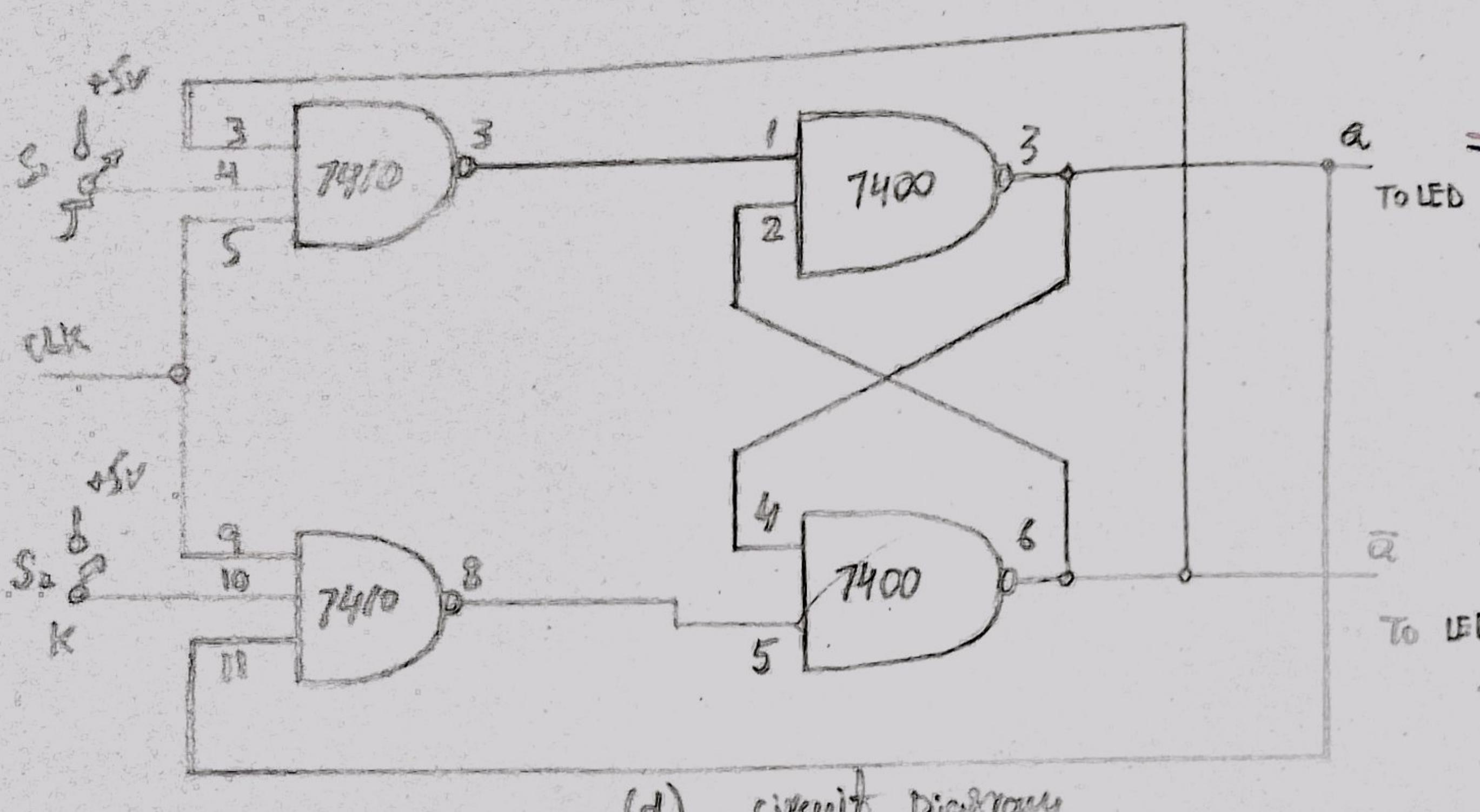
material Required:- logic trainer 1, tech kit 1, DMM, IC - 7400 1, resistors 10kΩ 2, resistor 100Ω 2, connecting wires as required.

procedure :-

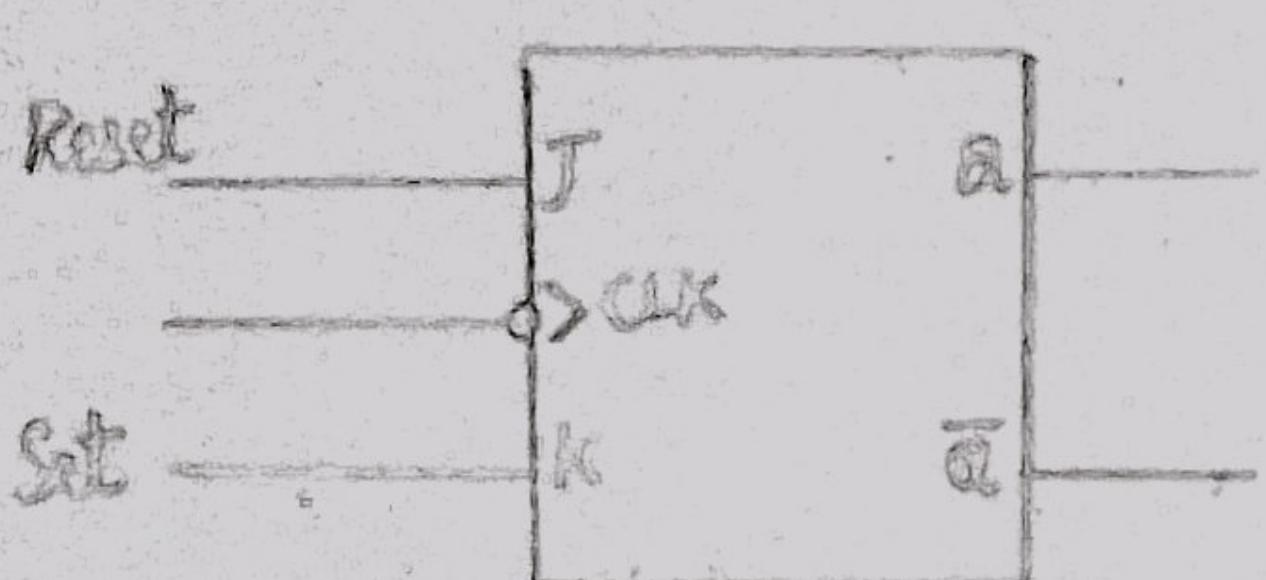
1. Assemble the circuit as shown. Switch on the power supply and note state of Q output.
2. Set 'S' and 'R' inputs to logic low(0) and apply clock pulse. There will be no change in output state of FF.
3. Apply logic high at 'S' input and apply clock pulse. The Q output will change from '0' to '1' or will remain '1', if already it was '1'. It's FF.
4. Set 'S' input low and 'R' high. This result RESET state of FF.
5. put both inputs at logic high and observe output
6. Repeat the above steps, draw neat diagram And draw truth table.

Precautions :-

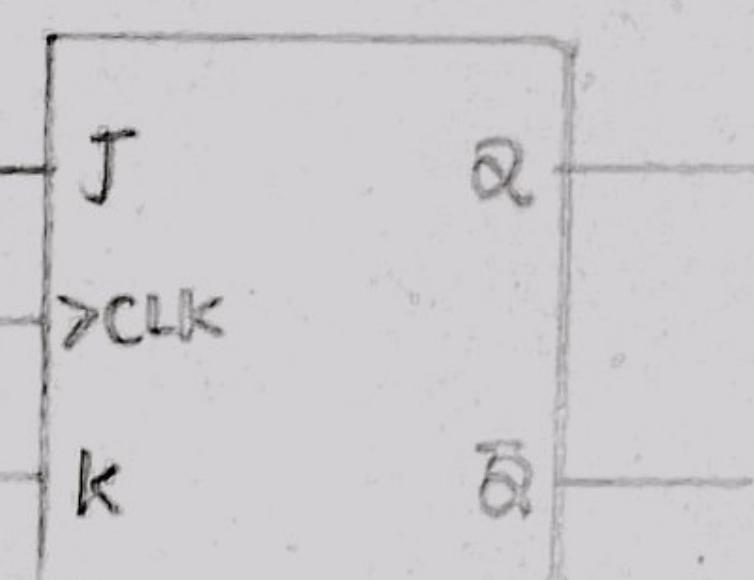
1. Use regulated DC supply.
2. Handle the IC carefully.
3. Avoid shorting during practical.
4. Ensure tight connections.



(d) circuit diagram



(a) -ve edge triggered



(b) +ve edge triggered

J	K	CLK	Q
0	0	↓	NC
0	1	↓	1
1	0	↓	0
1	1	↓	Q ₀

(c) Truthtable

7 Dec. 23

Electronics-II

CIT-244

Thru

Practical # 8 (Study of JK Flip Flop)

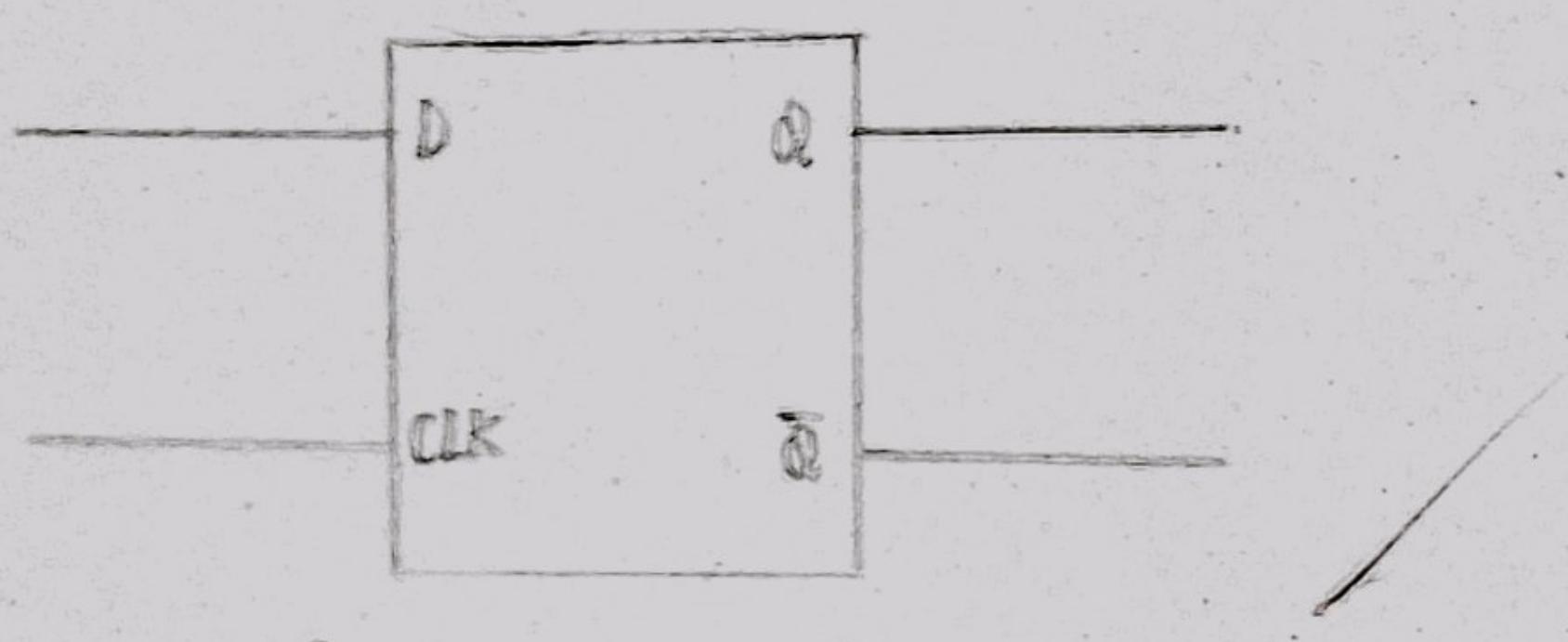
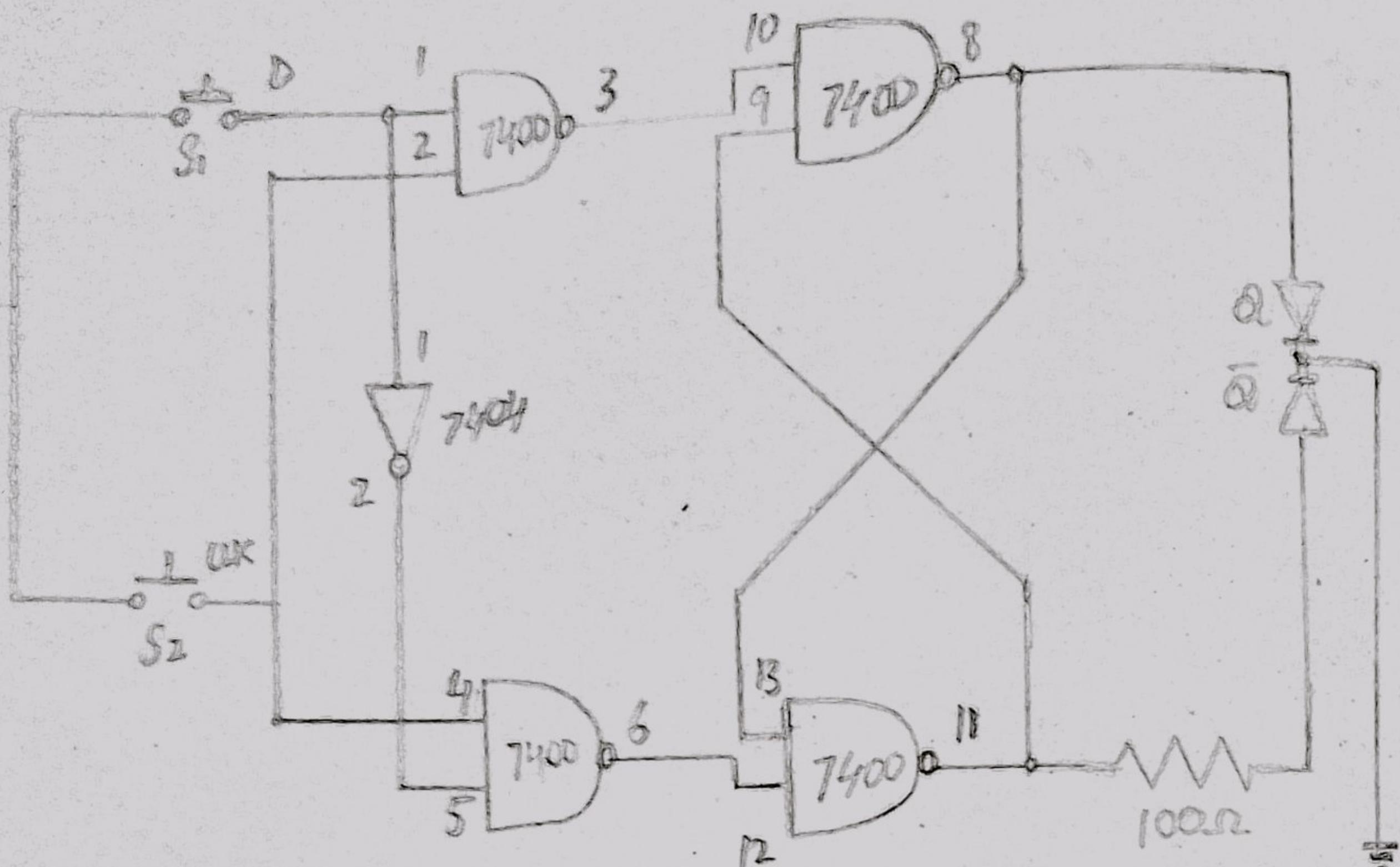
Materials:- Logic trainer, power supply, MM, connecting wires, tool kit, IC (7410, 7400), switch D, oscilloscope, dual trace and logic probe.

Procedure :-

1. Assemble the circuit on logic trainer. Select a suitable frequency of clock pulses.
 2. Use function generator available on the trainer for clock pulses. Better to use push buttons for clocking.
 3. Apply logic low at J and K inputs, then apply clock pulse. Observe output and record some in truth table.
 4. Now apply clock pulse by keeping J input high and K low. Observe output and record in the truthtable.
 5. Now J high and K low. Record in table.
 6. Now apply logic high at both. Observe it. This is toggle mode of JK FF.
- Draw neat diagram of FF and complete truthtable.

Precautions:-

1. Identify IC pins carefully.
 2. Use regulated DC supply.
 3. Avoid shorting during practical.
- Observe outputs carefully.



(a) Logic Diagram

Input		Output
CLK	D	Q
1	0	0
1	1	1

(b) Truth table

7 Dec - 23

Electronics II

CIT-204

Three

Practical # 09 (Study of D Flip Flop)

Materials:

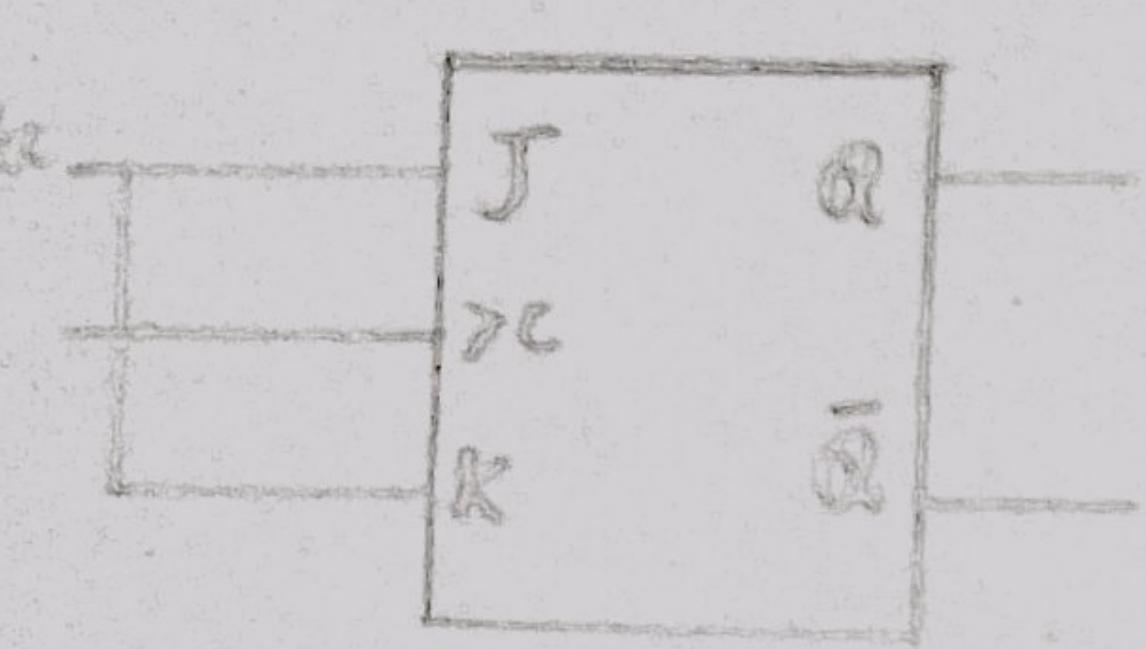
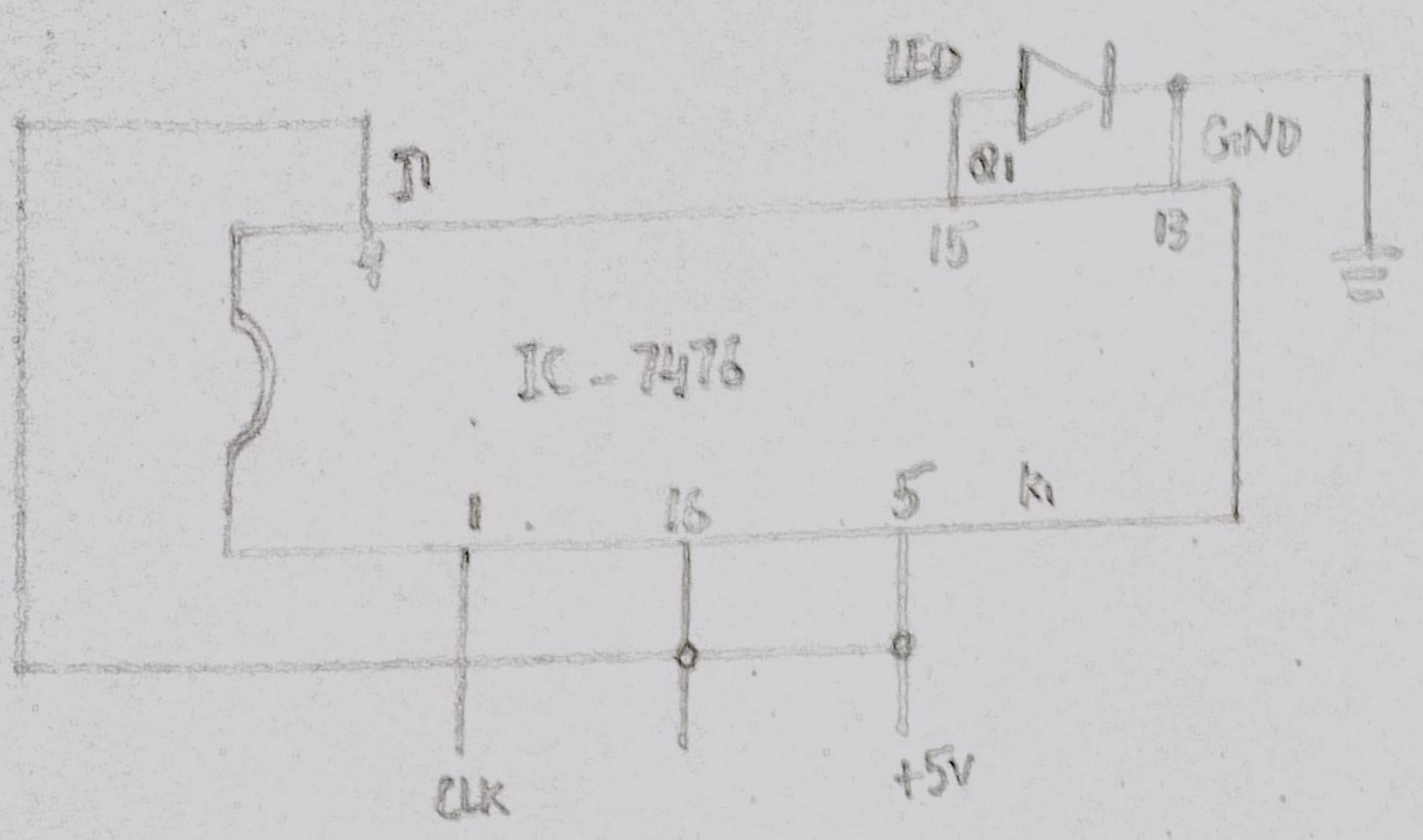
Breadboard, Jumper wires, Power supply, IC 7400, 7404, Tools kit, Switch (PB) 3, connecting wires, Red, green LEDs and notebook.

Procedure:

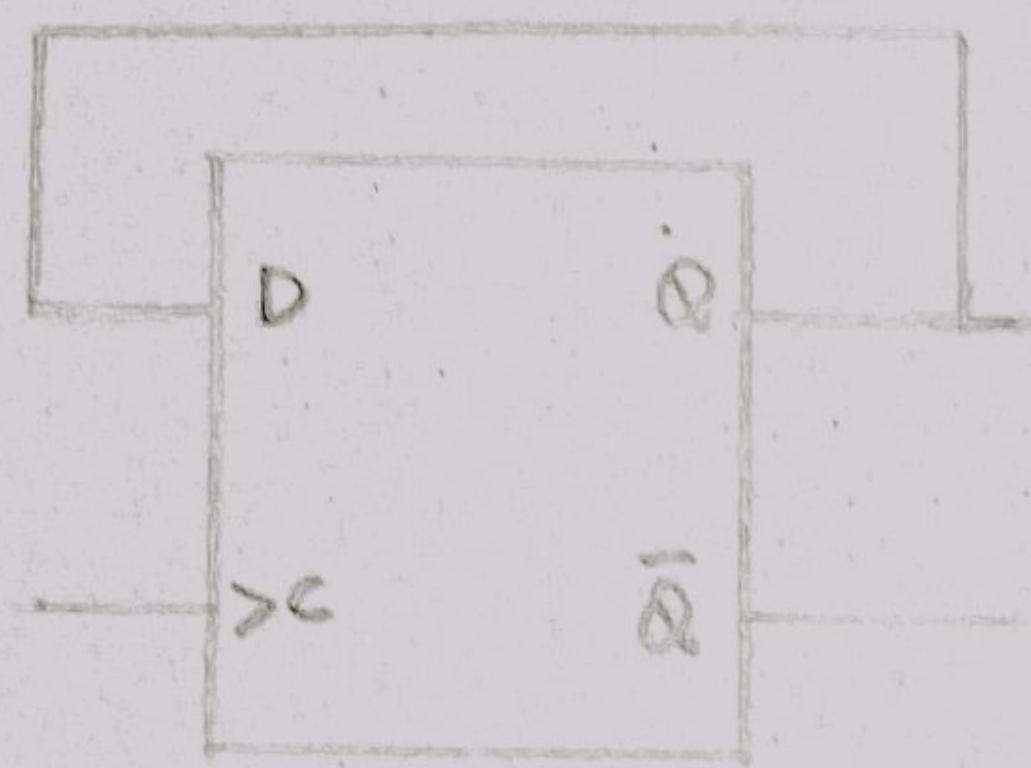
1. By keeping the power supply OFF, assemble the circuit.
2. By keeping both switches open, switch on power supply.
3. Apply logic high at D input by closing S1. Observe the output Q LED will glow.
4. Open 'S1' and close S2. Apply clock. Q LED will goes OFF and Q will glow.
5. Observe Q will glow.
6. Repeat steps 3, 4 & 5.
7. Record your observations in truth table.

Precautions:

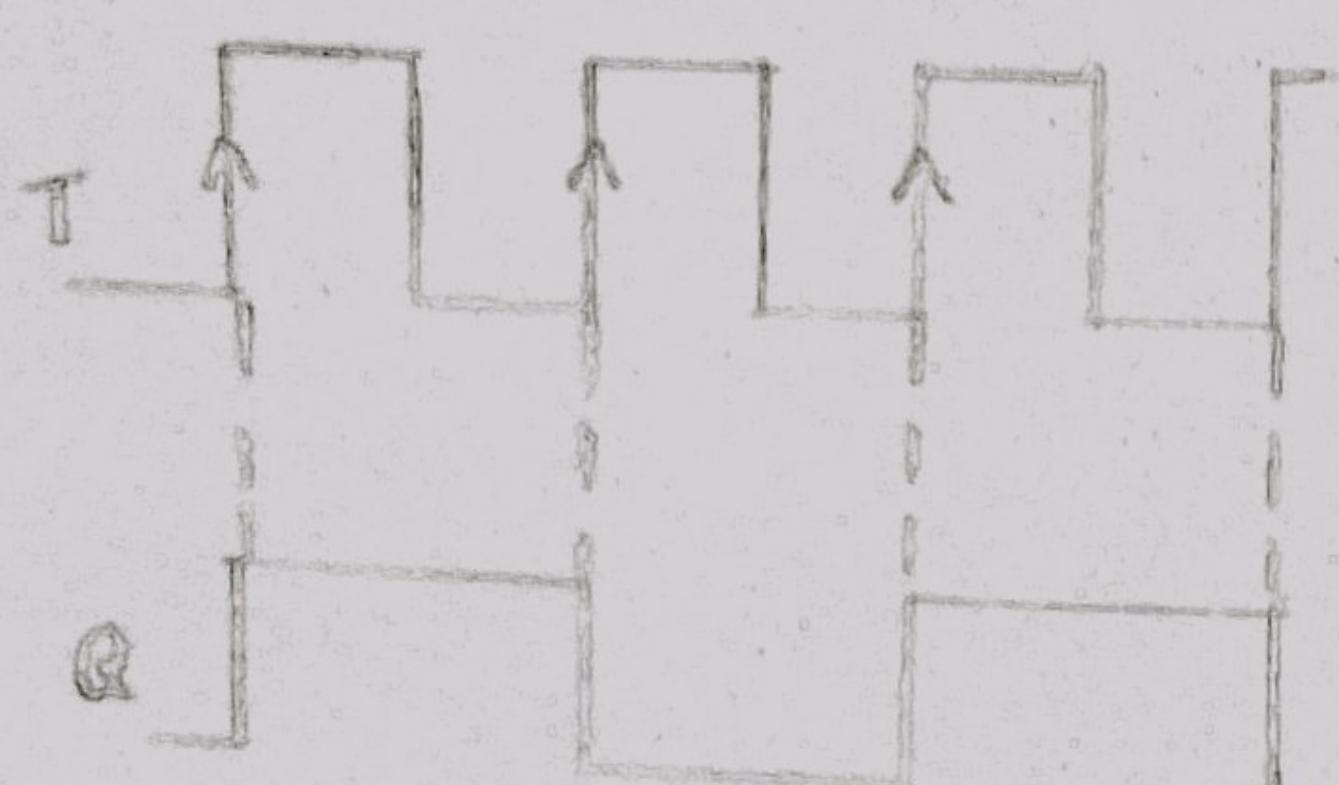
1. Use regulated DC supply.
2. Keep supply OFF while assembling.
3. Ensure right connection.



(a) T from JK



(b) T from D



(c)

7-Dec-23

Electronics II

CIT-244

Thru

Practical # 10 (Study of T-Type Flip Flop)

Materials:- logic trainer, power supply, connecting wires, DMM, Oscilloscope Dual Trace, IC: 7476, 741873, tools kit, HD ;

Procedure:-

1. Assemble the circuit as shown.
2. connect oscilloscope CH-1 with CLK input and CH-2 with Q1 output.
3. Switch on the circuit and apply clock pulses at pin number 1 as shown.
4. Observe the output (Q1). LED will alternately goes on and off. Observe timing of input pulses versus output at oscilloscope. Draw neat timing diagram in your note book.

Precautions:-

1. Use regulated DC supply.
2. Ensure tight connections.
3. Handle oscilloscope carefully.