LAB REPORT

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Computer Science and Engineering

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Section	:	B
Semester	:	2nd
Experiment No	:	10

Experiment name: Decoders

AIM:

(i) To realize a decoder circuit using basic gates.

(ii) To design a full adder using decoder.

Learning objectives:

(i) To Learn about working principle of decoder.

(ii) To Learn about the application of decoder.

(iii) To Learn implementing n to 8 decoder.

Theory:

A decoder is a combinational circuit that connects the binary information from 'n' input lines to a maximum of 2^n unique output lines. Decoder is also called a minterm generator/maxterm generator. A minterm generator is constructed using AND and NOT gates. The appropriate output is indicated by logic (1) → (positive logic → T). Maxterm is constructed using logic 1 (positive logic).

Manterm is constructed using NAND gates.

The appropriate output is indicated by logic 0 (negative logic).

Truth Table for full Adder;

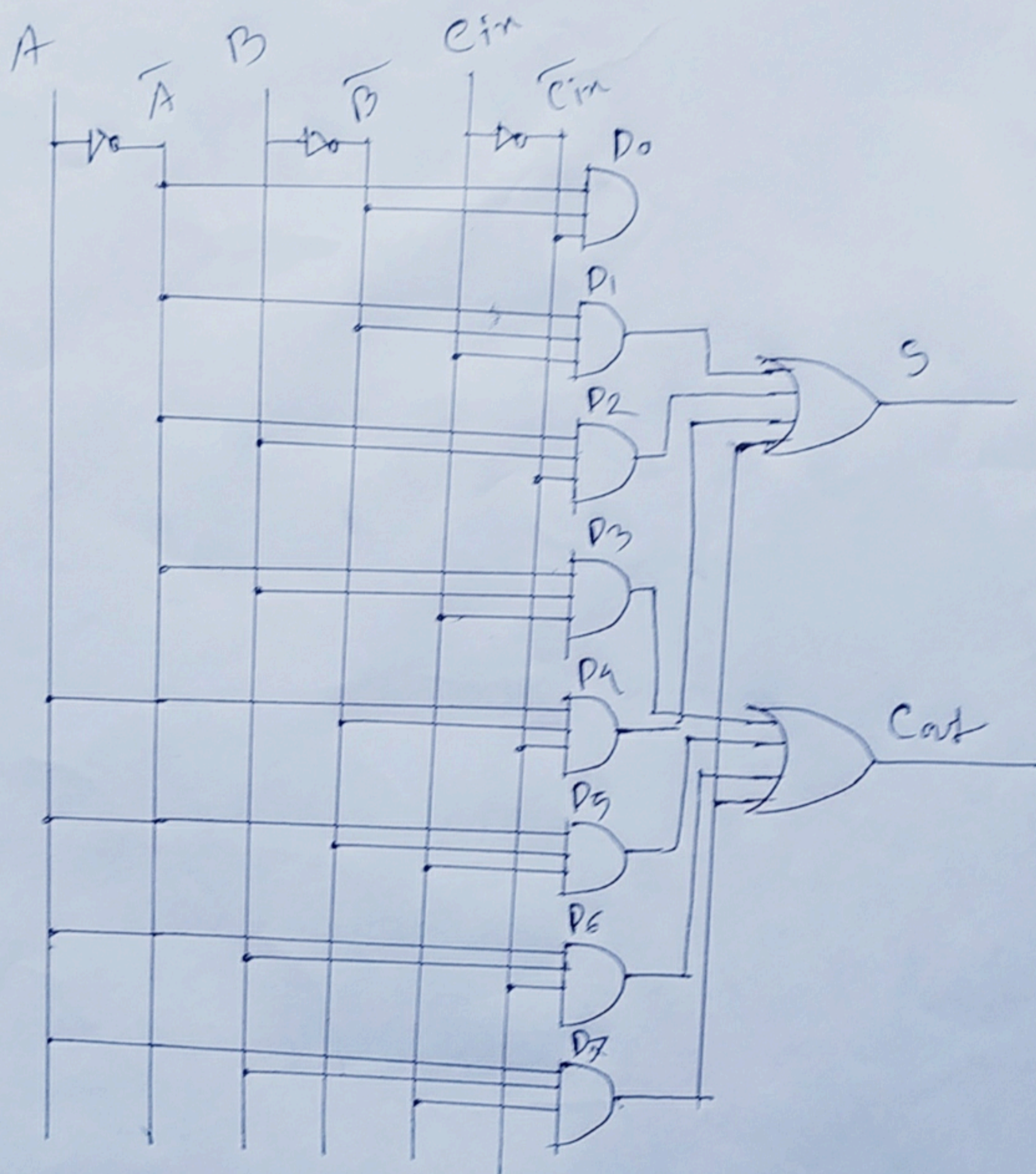| A	B	Cin	D₀	D₁	D₂	D₃	D₄	D₅	D₆	D₇	S	Cout
0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0	1	0
0	1	0	0	0	1	0	0	0	0	0	1	0
0	1	1	0	0	0	1	0	0	0	0	0	1
1	0	0	0	0	0	0	1	0	0	0	1	0
1	0	1	0	0	0	0	0	1	0	0	0	1
1	1	0	0	0	0	0	0	0	1	0	0	1
1	1	1	0	0	0	0	0	0	0	1	1	1

Here, $S = D_1 + D_2 + D_4 + D_7$

& $C_{out} = D_3 + D_5 + D_6 + D_7$

Components required:

IC 7404, IC 7408, IC 7432, Patch card & Trainor kit

Procedure:

(i) The connection were made as per the output circuit diagram.

(ii) The values of A, B and Cin were changed using switches.

(iii) The output results were observed and the truth table was verified.

(iv) The whole procedure is maintained.

Result:

The operation of 3 to 8 decoder was verified

Viva question:

Q. What are the applications of decoder?

Ans)

(i) There are used in analog to digital conversion is analog decoders.

(ii) To convert instructions into CPU we use decoder.

(iii) Mainly these are used in logical circuits and for data transferring.

Q. What is the difference between decoder and encoder?

Ans) Encoders convert digital data into binary data. On the other hand, decoders convert binary data into digital data.

Q. For $n \rightarrow 2^n$ decoder, how i/p lines & how many o/p lines are there?

Ans: input line $\rightarrow n$, output line $\rightarrow 2^n$

② What is the difference between decoder and demux?

Ans: A demux is a circuit that passes the input to several output depending on selection line. A decoder is a circuit that converts input signals or decoder the signals.