Exp#12

Name of Experiment: Design & Implementation of an Encoder.

Objective: -To understand the design and implementation of an encoder using logic gates and verify the truth table.

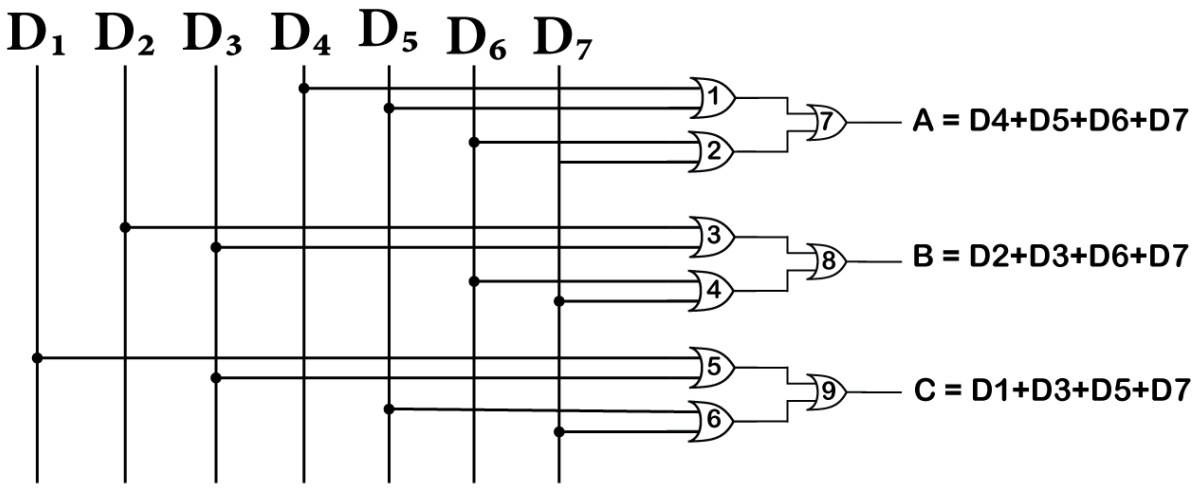
Apparatus required:-The following electronics components are required.

- OR Gate (IC-7432)
- Digital IC Trainer KIT
- Breadboard
- Connecting wires

Description:-

An encoder is a digital circuit that performs inverse operation of a decoder. An encoder has 2n input lines and n output lines. In encoder the output lines generates the binary code corresponding to the input value. In octal to binary encoder it has eight inputs, one for each octal digit and three output that generate the corresponding binary code. In encoder it is assumed that only one input has a value of one at any given time otherwise the circuit is meaningless. It has an ambiguity that when all inputs are zero the outputs are zero. The zero outputs can also be generated when D0 = 1.

Logic Circuit:-



Truth-table:-

Inputs							Outputs		
D_1	D_2	D_3	D_4	D_5	D_6	D_7	A	B	C
1	0	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	1	0
0	0	1	0	0	0	0	0	1	1
0	0	0	1	0	0	0	1	0	0
0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	1	1	1	1

Boolean Expression: -

If inputs are D_1, D_2, D_3, D_4, D_5, D_6 and D_7 then expression of encoder circuit will be-

A = $D_4+D_5+D_6+D_7$

B = $D_2+D_3+D_6+D_7$

C = $D_1+D_3+D_5+D_7$

Procedure to Perform:-

- Take Digital Trainer KIT with three unit of IC-7432 and connecting leads.
- Insert the ICs on the Breadboard.
- According to pin configuration of IC perform the connections.
- Connect Vcc(+5V) to pin no-14 and Connect Pin no-7 to GND of ICs.
- Connect the OR Gate input connection to the input switched D1, D2, D3, D4, D5, D6 and D7 to the Digital Trainer KIT (Inputs are pin no (1,2),(4,5),(8,9),(11,12) and Outputs are pin no 3, 6, 10, 13).
- Connect the input switch **D_4, D_5** with OR gate 1.
- Connect the input switch **D_6, D_7** with OR gate 2.
- Connect the input switch **D_2, D_3** with OR gate 3.
- Connect the input switch **D_6, D_7** with OR gate 4.
- Connect the input switch **D_1, D_3** with OR gate 5.
- Connect the input switch **D_5, D_7** with OR gate 6.
- Connect the output of gate 1 and gate 2 as input for OR gate 7.
- Connect the output of gate 7 as Boolean expression of A with an output LED.
- Connect the output of gate 3 and gate 4 as input for OR gate 8.
- Connect the output of gate 8 as Boolean expression of B with an output LED.
- Connect the output of gate 5 and gate 6 as input for OR gate 9.

- ❖ Connect the output of gate 9 as Boolean expression of C with an output LED.
- ❖ Switch On the Digital IC Trainer KIT.
- ❖ Apply the various combination of Truth table and verify the output at LED's.
- ❖ If output LED glows RED it shows logic HIGH or 1.
- ❖ If output LED glows GREEN it shows logic LOW or 0.
- ❖ Switch off the Digital Trainer KIT after performing the Experiment.
- ❖ Disconnect Output from the LED and note down the corresponding multi-meter voltage reading for various combinations of inputs (not required).

Conclusion: - All the output is verified according to the result of the truth table.

Precaution in lab:-

- •All the connections should be tight and proper.
- •Handle the ICs carefully.
- •Check the connection once again before Switching on the Digital Trainer KIT.
- •Switch off the Trainer Kit after performing the Experiment.