Course Name: A Level (1st Sem)   **Subject: CO**

**Topic: Multiplexer**   **Date: 26-03-20**

Multiplexer: A multiplexer (MUX) is a device allowing one or more low-speed analogue or digital input signals to be selected, combined and transmitted at a higher speed on a single shared medium or within a single shared device. A MUX functions as a multiple-input, single-output switch. With two input signals and one output signal, the device is referred to as a 2-to-1 multiplexer; with four input signals it is a 4-to-1 multiplexer; etc.

A 4 to 1 line Multiplexer: For a 4-input multiplexer we would require two data select lines as 2- select inputs represent $2^2 = 4$ data control lines. We need all 4 control lines since we have to select one particular input out of four discrete inputs. Now we design a circuit with four inputs, I_0, I_1, I_2, I_3 and two data select lines S_0 and S_1 as shown below:
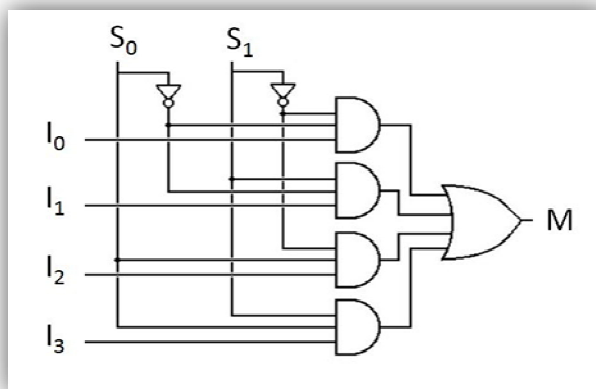
S_0	S_1	M
0	0	I_0
0	1	I_1
1	0	I_2
1	1	I_3

Circuit Diagram   **Truth Table**

Here we need to presume that all the input lines (I_0, I_1, I_2 and I_3) are always 1. Now when the select inputs S_0 and S_1 are 0,0; all three inputs to the first AND gate become 1 thereby reflecting that I_0 is going as output (M). Other combinations of select inputs are working similarly for selecting other inputs.

Assignments:

   1. What is a multiplexer? Why do we need select lines?
   2. Design an 8 to 1 line multiplexer along with its Truth Table.