1. How many inputs does a decoder have if it has 64 outputs?

Ans

n input = 2n output

64 outputs = 26 = 6 inputs

1. How many control lines does a multiplexer have if it has 32 inputs?

Ans

Log232 = 5 control lines

1. Find the truth table that describes the following circuit:

Diagram

Description automatically generated

Ans

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **y** | **z** | **x** |  |  | **xy** |  | **+ x** |  |  |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

1. Complete the truth table for the following sequential circuit:

Diagram

Description automatically generated

5. 59. A Mux-Not flip-flop (MN flip-flop) behaves as follows: If M = 1, the flip-flop complements the current state. If M = 0, the next state of the flip-flop is equal to the value of N.

1. a)  Derive the characteristic table for the flip-flop.
2. b)  ShowhowaJKflip-flopcanbeconvertedtoaMNflip-flopbyaddinggate(s)and inverter(s).