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Program : BSc in CSE

Course : 231 Digital Logic Design

Ans to the Q: No: 2(a)

Decoder: A decoder is a circuit that changes a code into a set of signals. It is called a decoder because it does the reverse of encoding. But we will begin our study of encoders and decoders with decoders because they are simpler to design.

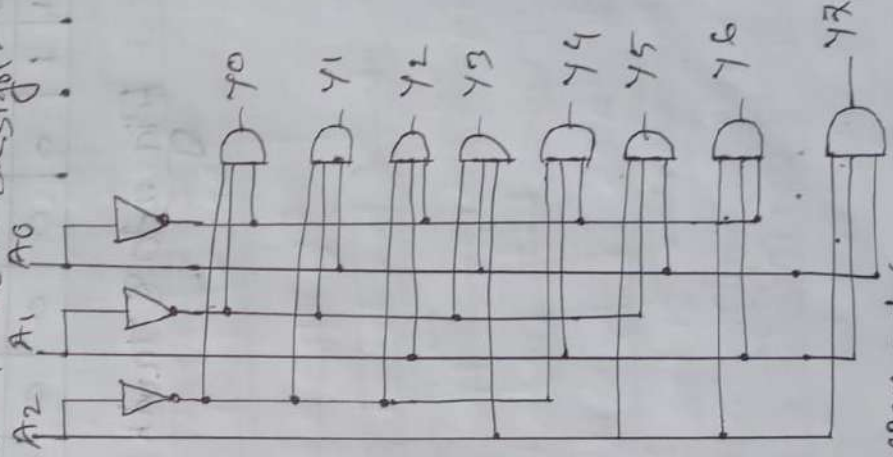


Fig Logic Diagram 3 to 8

3 to 8 Truth Table:

Enable	input			output							
	A ₂	A ₁	A ₀	Y ₇	Y ₆	Y ₅	Y ₄	Y ₃	Y ₂	Y ₁	Y ₀
0	x	x	x	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	1
1	0	0	1	0	0	0	0	0	0	1	0
1	0	1	0	0	0	0	0	0	1	0	0
1	0	1	1	0	0	0	0	1	0	0	0
1	1	0	0	0	0	0	1	0	0	0	0
1	1	0	1	0	0	1	0	0	0	0	0
1	1	1	0	0	1	0	0	0	0	0	0
1	1	1	1	1	0	0	0	0	0	0	0

Fig 3 to 8 truth table.

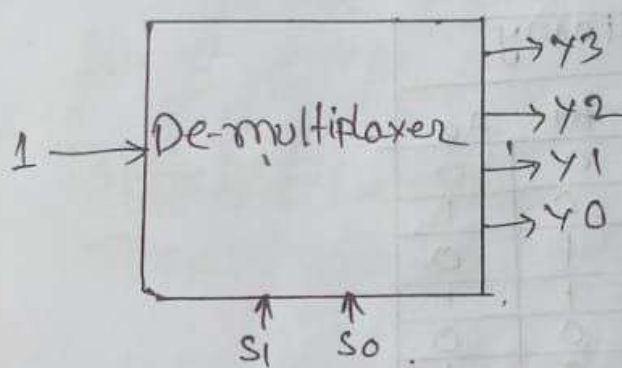


Fig 3 to 8 truth table

Ans to the Q No 1.(a)

Demultiplexer: A demultiplexer is a device that takes a single input line and routes it to one of several digital output lines.

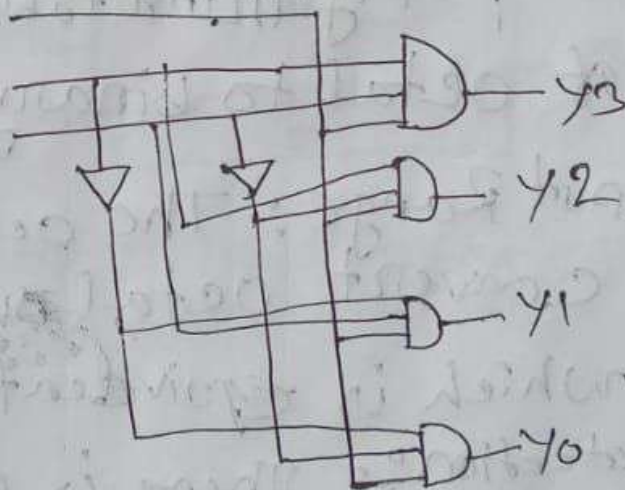
We have 1×2 , 1×4 , 1×8 Demultiplexers.



input		output			
S1	S0	Y3	Y2	Y1	Y0
0	0	0	0	0	1
0	1	0	0	1	0
1	0	0	1	0	0
1	1	1	0	0	0

Fig 2 Truth table

$$\begin{aligned}
 Y_3 &= S_1 S_0 I \\
 Y_2 &= S_1 S_0' I \\
 Y_1 &= S_1' S_0 I \\
 Y_0 &= S_1' S_0' I
 \end{aligned}$$



Fig's Logic Diagram:

Ans to the Q: No: 2(b)

JK Flipflops: JK flipflop is a basically a gated SR flip flop with the additional of a clock input circuitry that prevents the illegal or invalid output condition that can occur when both inputs S and R are equal to logical level "1" Logic "0" no, "change" and "toggle", the symbol for a JK flip-flop is similar to that of an SR Bistable Latch as seen in the previous tutorial except for the additional of clock input.

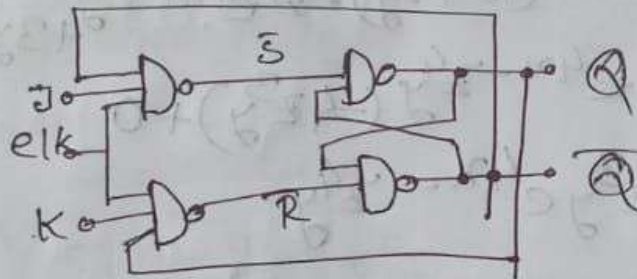


Fig JK Flip Flop Logic Diagram

Ans to the Q No 1(b)

An Encoder is a combinational circuit that performs the reverse operation of Decoder. It has maximum of n input lines and n output lines.

Octal to binary encoder Truth table:

Decimal Digit	Binary		
	A ₂	A ₁	A ₀
D ₀	0	0	0
D ₁	0	0	1
D ₂	0	1	0
D ₃	0	1	1
D ₄	1	0	0
D ₅	1	0	1
D ₆	1	1	0
D ₇	1	1	1

Fig Truth table.

* Limitation of Octal to binary Encoder:

- ① Limited Input Range: The Octal Binary Encoder can only convert Octal number up to 177 (Octal), which is equivalent to 128 (Binary).
- ② Error Detection: There is no built-in error detection mechanism in the Octal Binary Encoder. If an invalid Octal input is provided the output may not be accurate or may be incorrect etc.