

Paper 7, TDC Part-3
**Chapter– 1, Fundamental Concept of Digital
Electronics**

Question and Answer Lecture - 1

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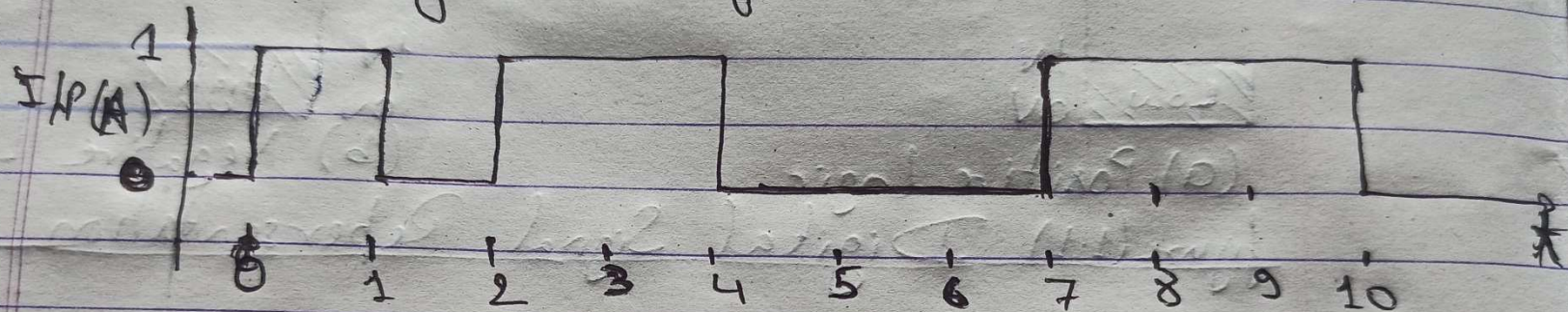
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Eg 1.0 If the waveform shown in fig (1.3) is applied as the input signal to a NOT gate, find the output signal waveform.



Solution: From $t=0$ to $t=1$, $A = 1$ (High)
Therefore \therefore $t=0$ to $t=1$, $Y = \bar{A} = \bar{1} = 0$ (Low)

Now, From $t=1$ to $t=2$, $A = 0$ (Low)
Therefore \therefore $t=1$ to $t=2$, $Y = \bar{A} = \bar{0} = 1$ (High)

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Now from $t=2$ to $t=4$, $A = 1$ (High)

Therefore, from $t=2$ to $t=4$, $Y = \bar{A} = \bar{1} = 0$ (Low)

Now, from $t=4$ to $t=7$, $A = 0$ (Low)

Therefore, from $t=4$ to $t=7$, $Y = \bar{A} = \bar{0} = 1$ (High)

Now from $t=7$ to $t=10$, $A = 1$ (High)

Therefore, from $t=7$ to $t=10$, $Y = \bar{A} = \bar{1} = 0$ (Low)

For $t > 10$, $A = 0$ (Low)

So, for $t > 10$, $Y = \bar{A} = \bar{0} = 1$ (High).

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Example 1.1) In a chemical process an Alarm is required to be activated if either temperature or pressure or both exceed certain limits. Is it possible to express this operation in terms of a digital operation? If yes, find the operation.

Solution - Let the temperature and pressure be converted into electrical signals with the help of transducers. $T=1$ if Temperature exceeds the specified limit and $P=1$ if pressure exceeds the specified limit. If $T=1$ or $P=1$ or both T and P are 1 then the alarm is required to be activated, ~~is~~ This operation can be expressed as,

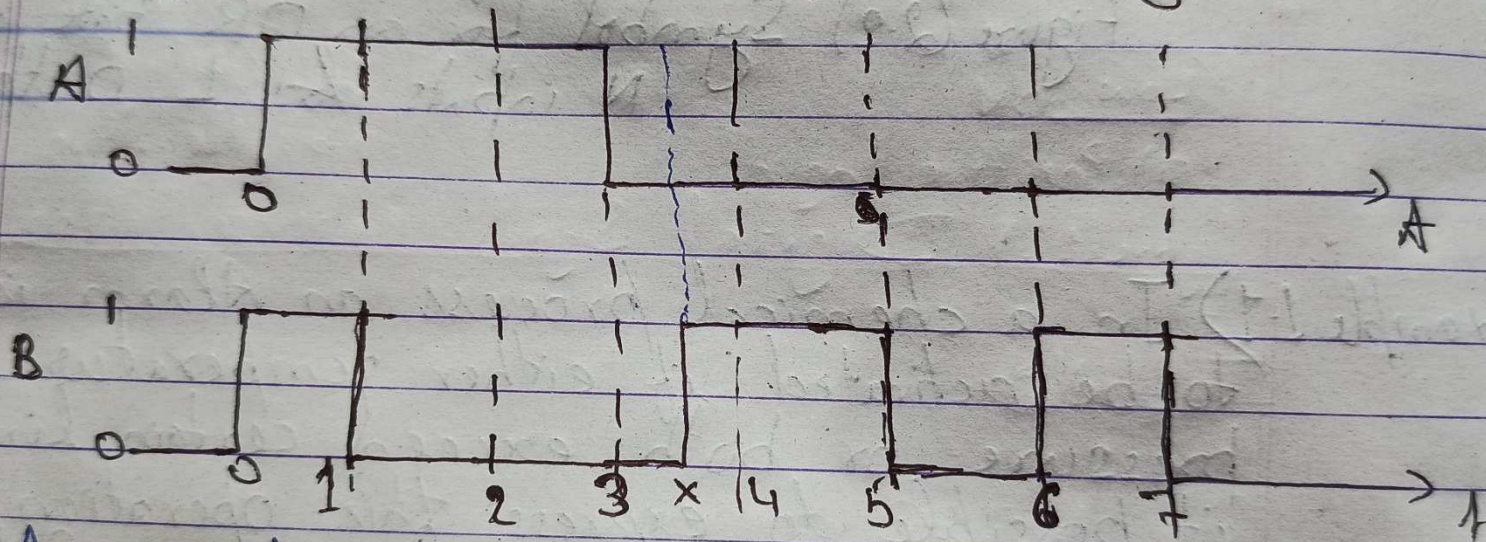
$$Y = T \text{ OR } P$$

$$Y = T + P$$

That is an OR operation.

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Example 1.2) Determine the output waveform for a two input OR-Gate to which applied signals A & B waveform are given below.



Solution As we know that the output of an OR Gate is "low" or "0" only when all the input signals are "low" or "0" else the output of the OR-Gate is "High" or "1".

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Gate is ~~go~~ Low or "0" only when all the input signals are "Low" or "0" else the output of the OR-Gate is "High" or "1"

So from above wave form we can find the output of the OR-Gate

From $t=0$ to $t=1$; $A=1$, $B=1$ so, $O/p(Y)=1$

1. $t=1$ to $t=2$; $A=1$, $B=0$ so, $O/p(Y)=1$

" $t=2$ to $t=3$; $A=1$, $B=0$ " $Y=1$

" $t=3$ to $t=X$; $A=0$, $B=0$ so, $Y=0$

" $t=X$ to $t=4$; $A=0$, $B=1$ so, $Y=1$

" $t=4$ to $t=5$; $A=0$, $B=1$ so, $Y=1$

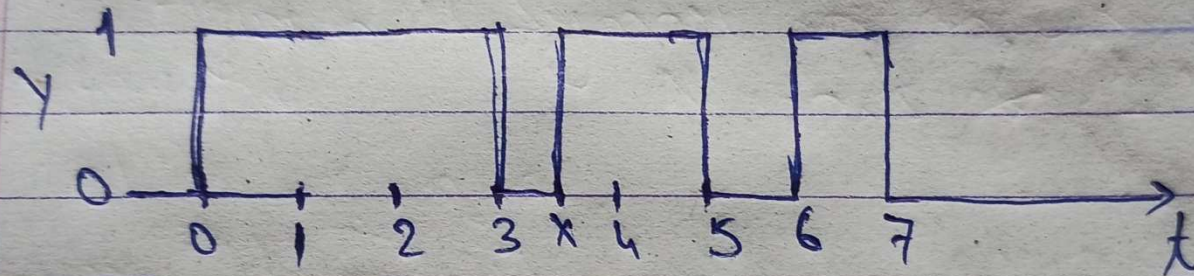
" $t=5$ to $t=6$; $A=0$, $B=0$ so, $Y=0$

$t=6$ to $t=7$; $A=0$, $B=1$ so, $Y=1$

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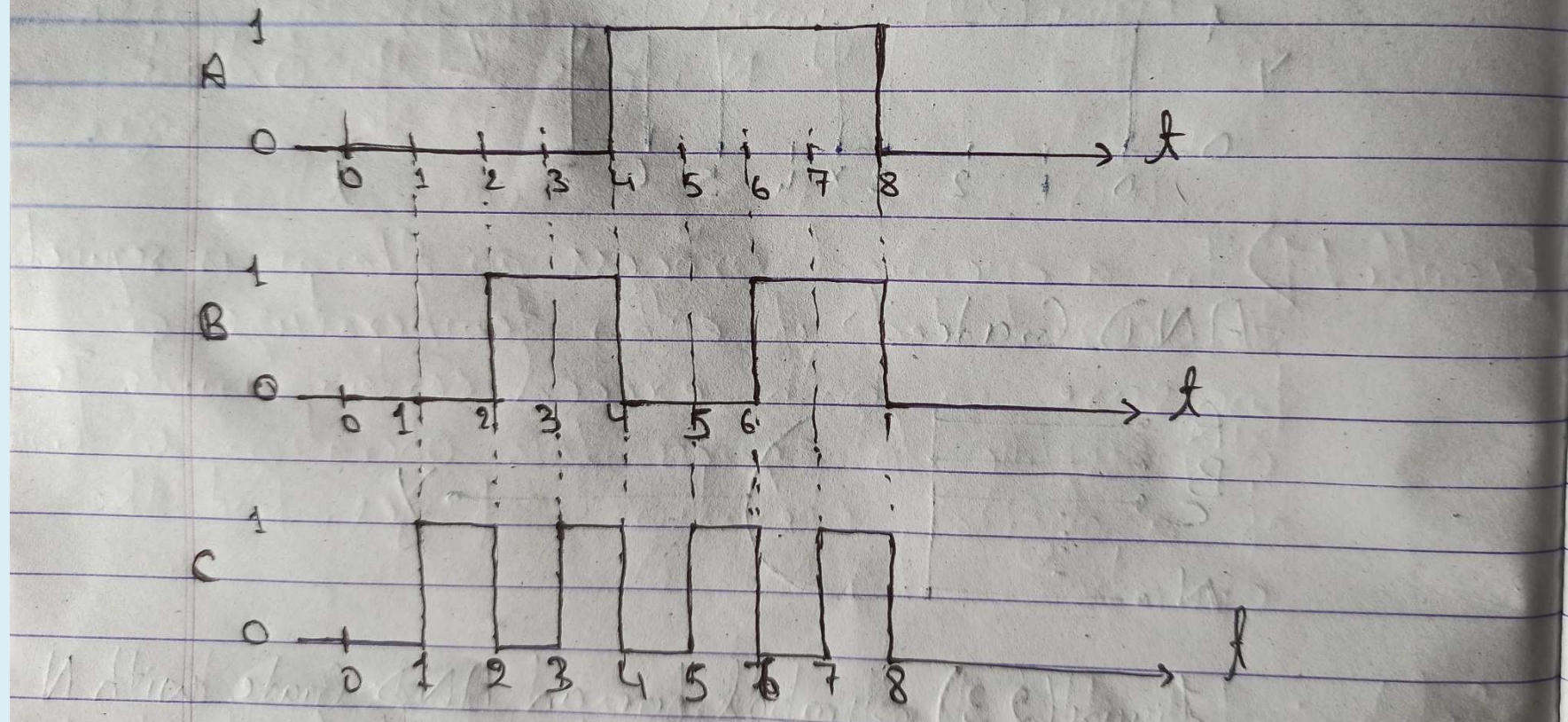
As for $A > 7$; $A = B = 0$; so $Y = 0$

O/P waveform, of the OR Gate is.

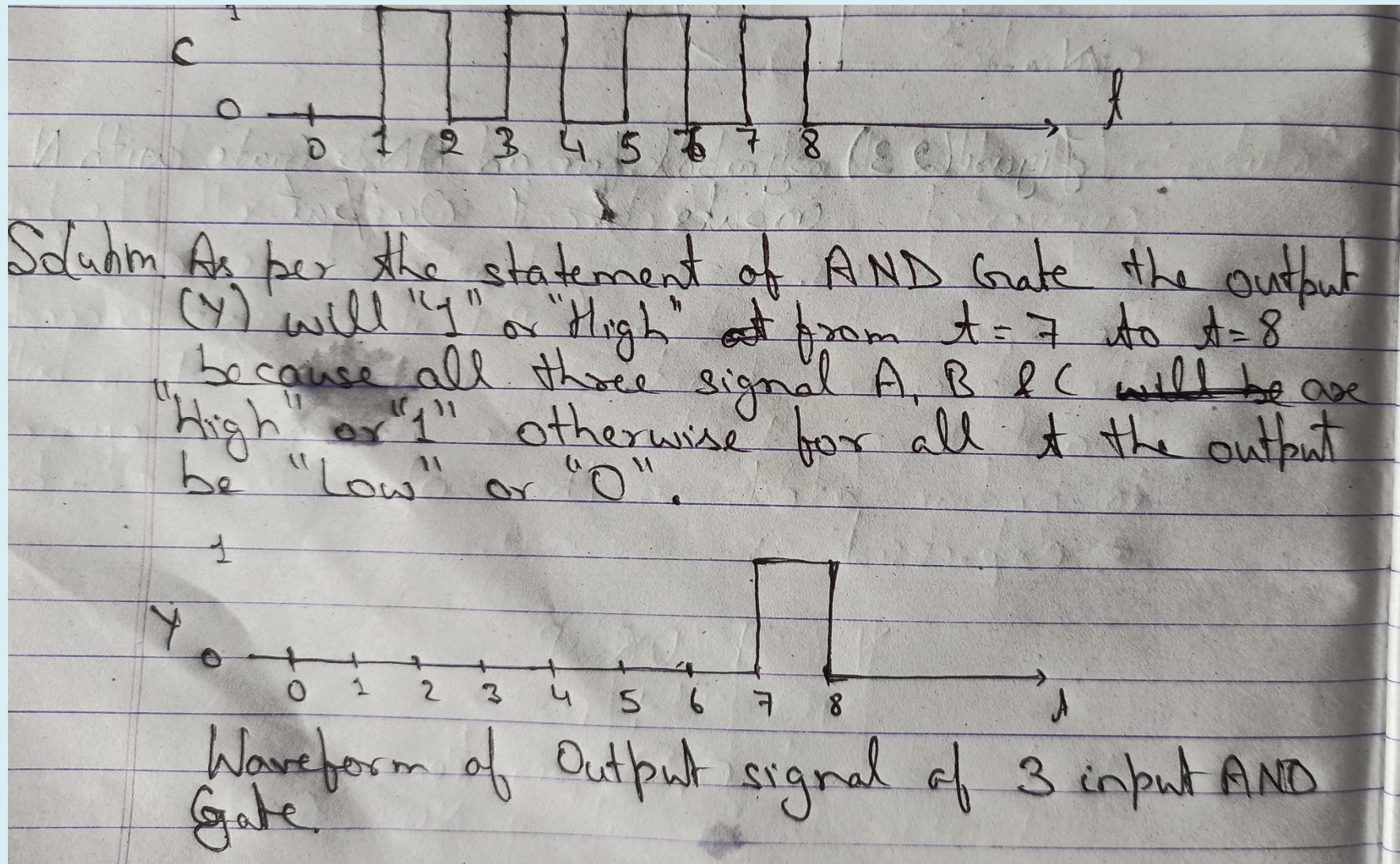


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Example (1.3) Determine the output waveform of a 3 input AND gate, to which applied signals A, B & C waveform are given below.



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For any query either message your doubt through what's app or call on 9771474020

Thank you