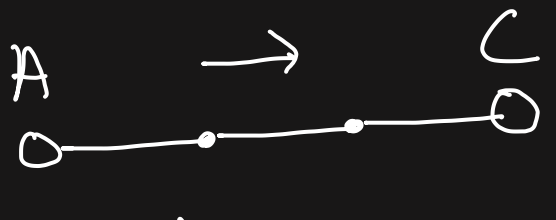
Lecture 5

Why Diodes?

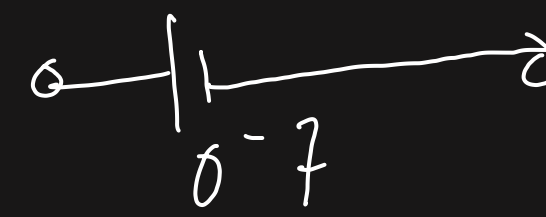
Ideal Diodes

Forward Bias: 2 terminals → Anode, A
→ Cathode, C

→ $V_{Anode} > V_{cathode}$



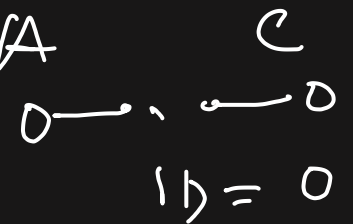
→ Short Circuit



→ non-ideal

Reverse Bias:

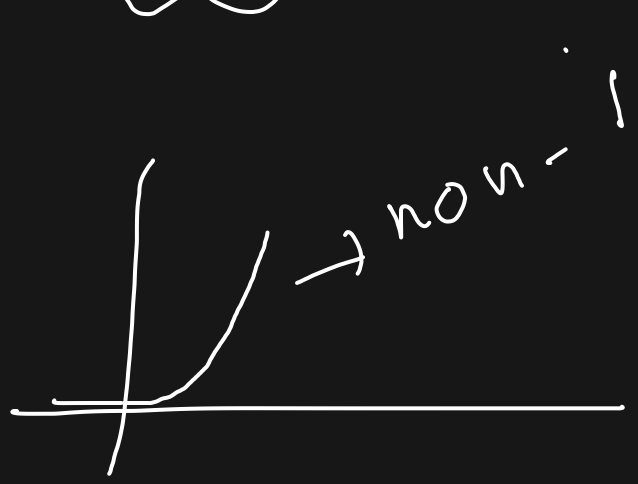
→ $V_{Anode} < V_{cathode}$



→ Open Circuit

I–V characteristics

$V_D = V_A - V_c$



Region 1 : $V_D < 0$;

$I_D = 0$

Diode

→ 2 terminal, pn junction

→ non-linear

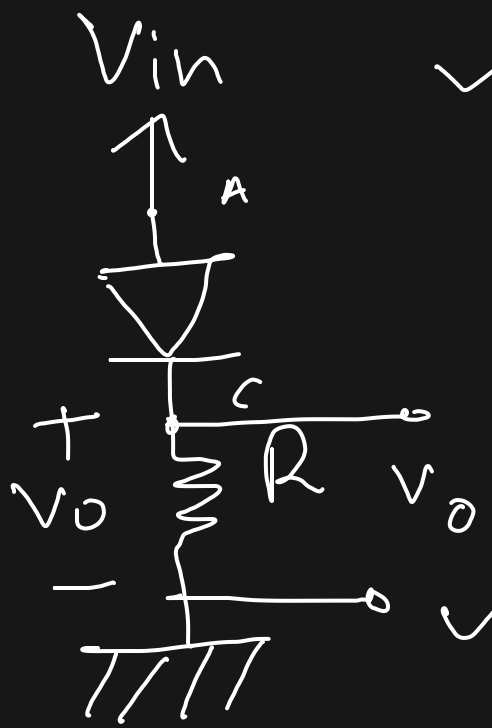
→ Valve

→ Ideal : Piecewise Linear

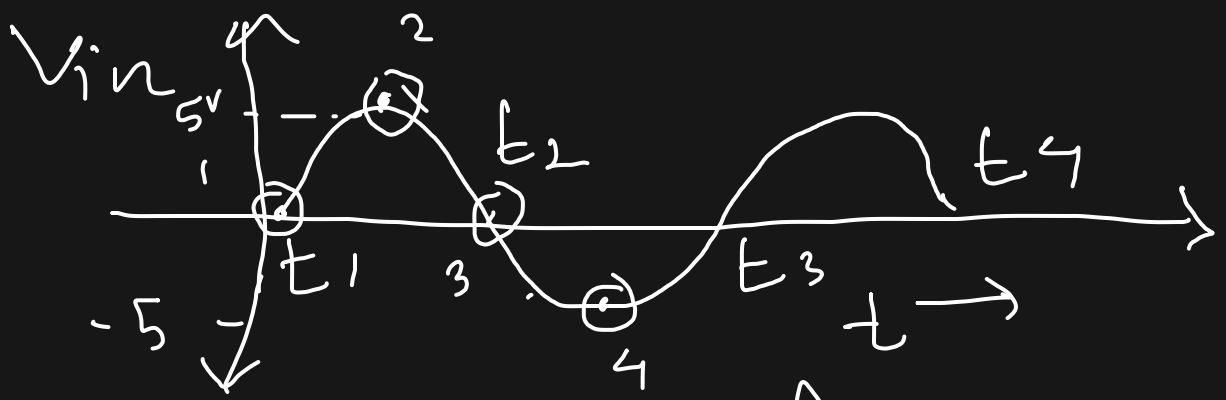
→ Application: Rectifiers, Logic gates

Half-wave Rectifier

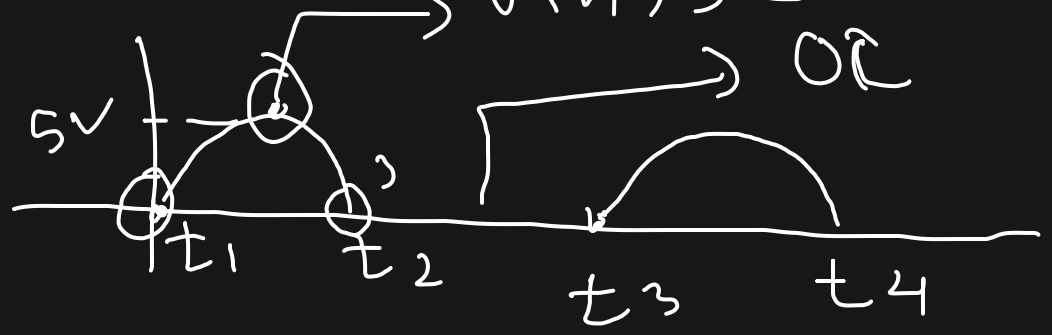
D_1 = Ideal Diode

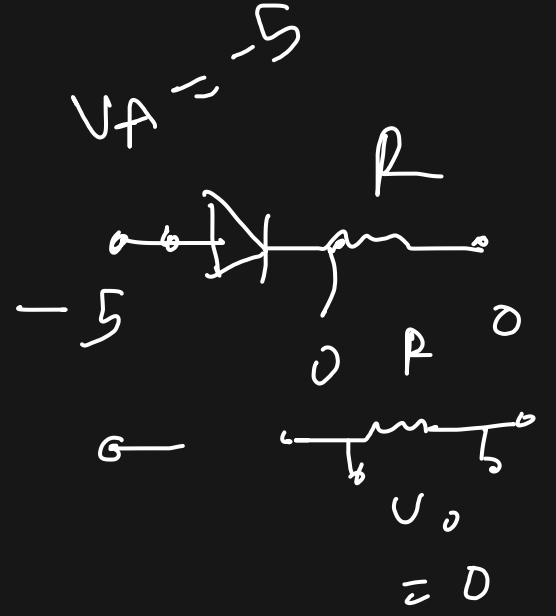


✓ Input waveform :

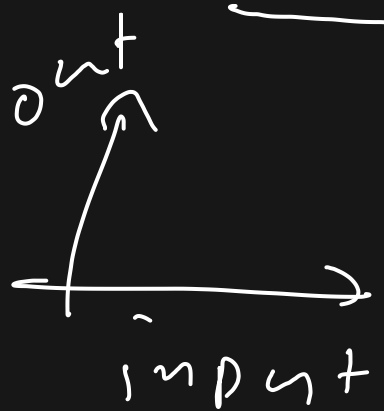


✓ Output waveform :



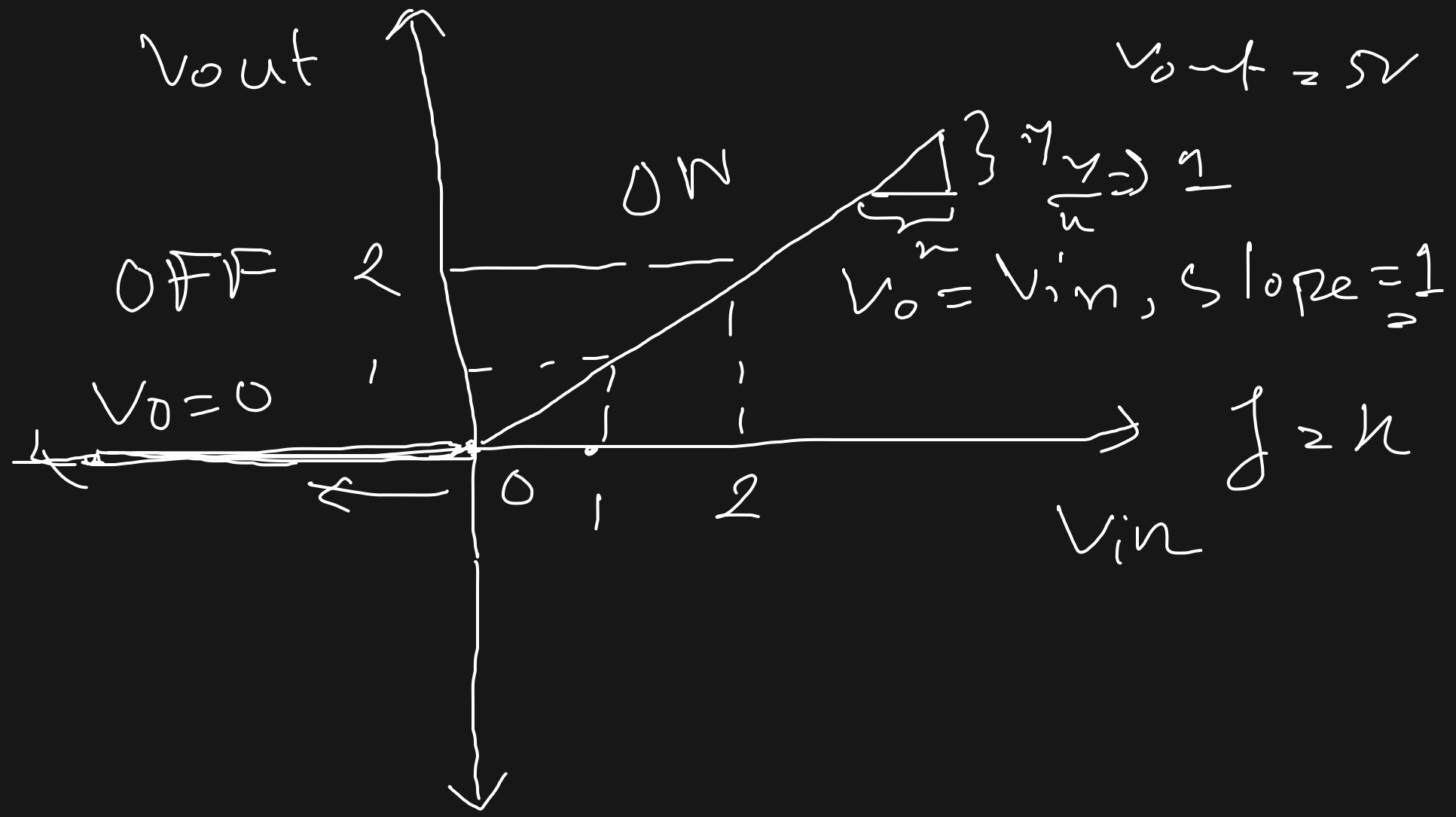


Transfer characteristics



$V_{in} = 5V$

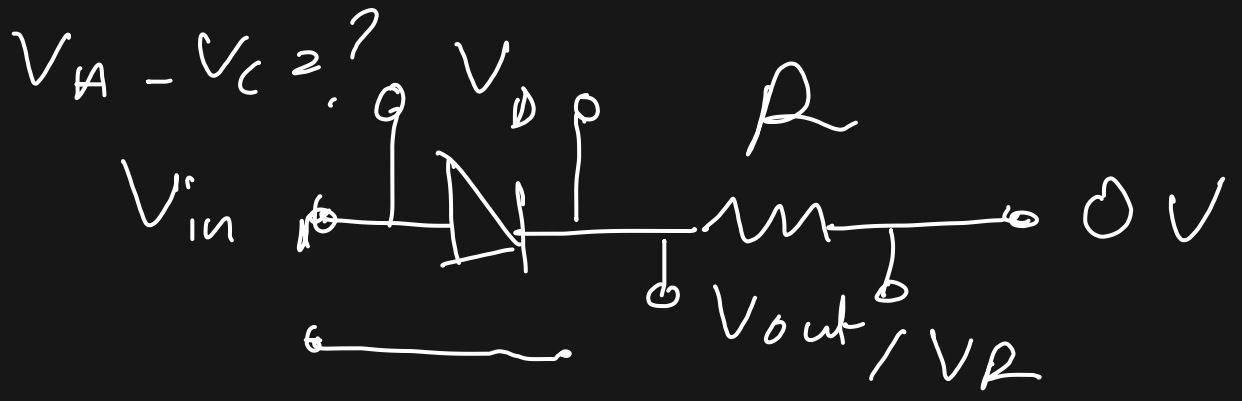
$V_{out} = 5V$

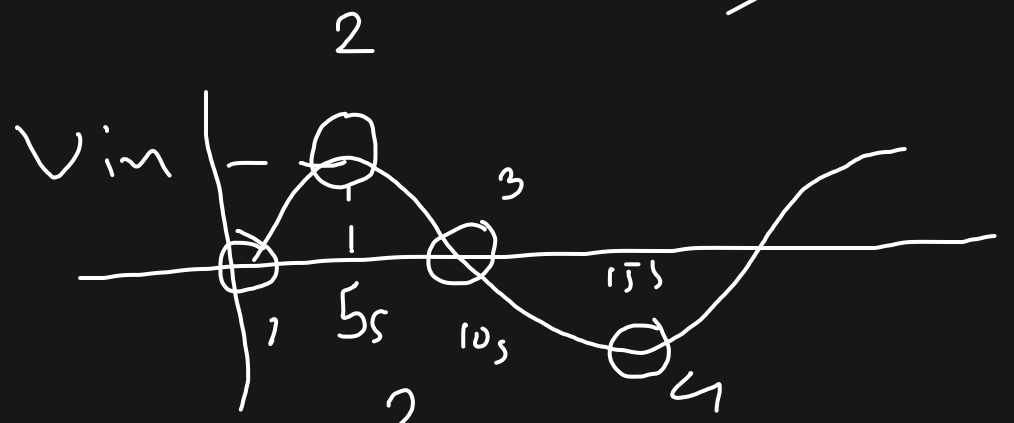


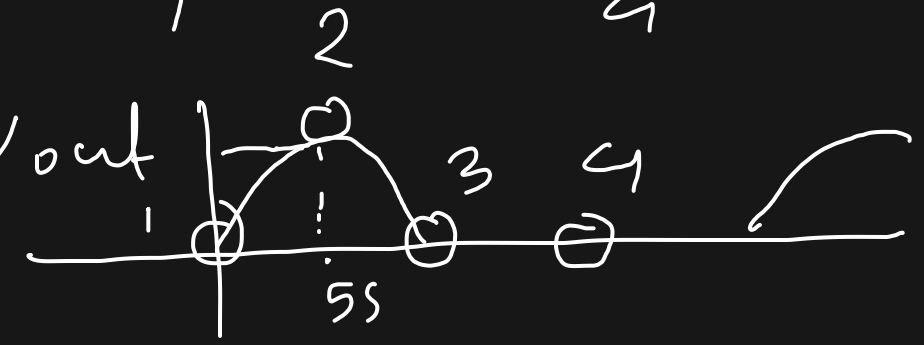
What is the voltage across Diode?

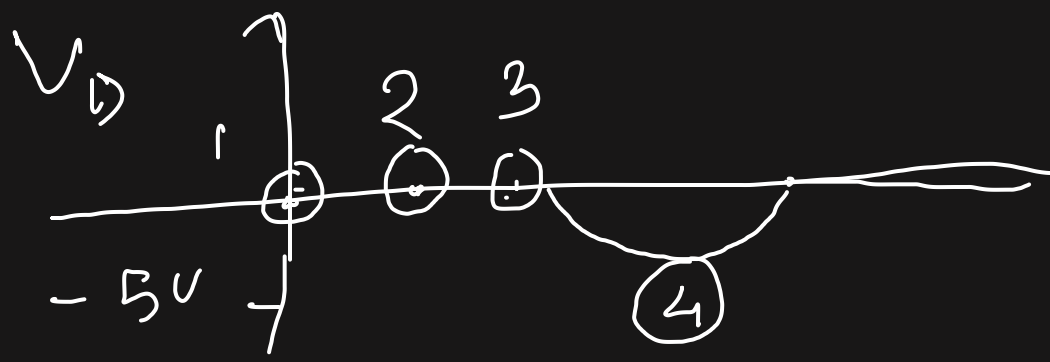
$V_{in} = V_D + V_{out} + 0$

$\Rightarrow V_D = V_{in} - V_{out}$



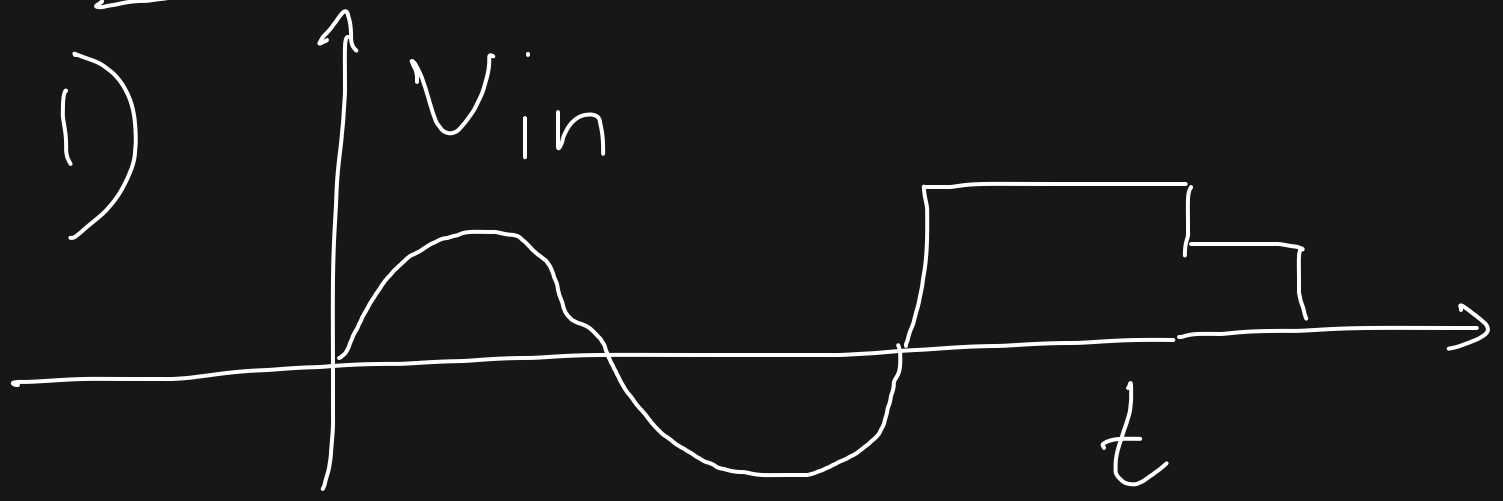


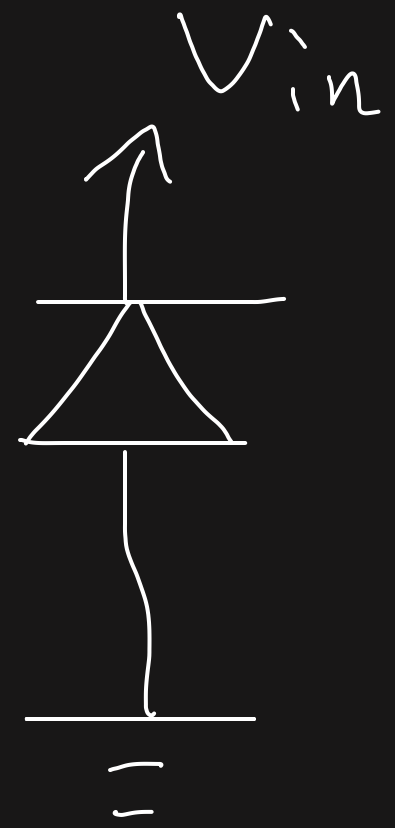




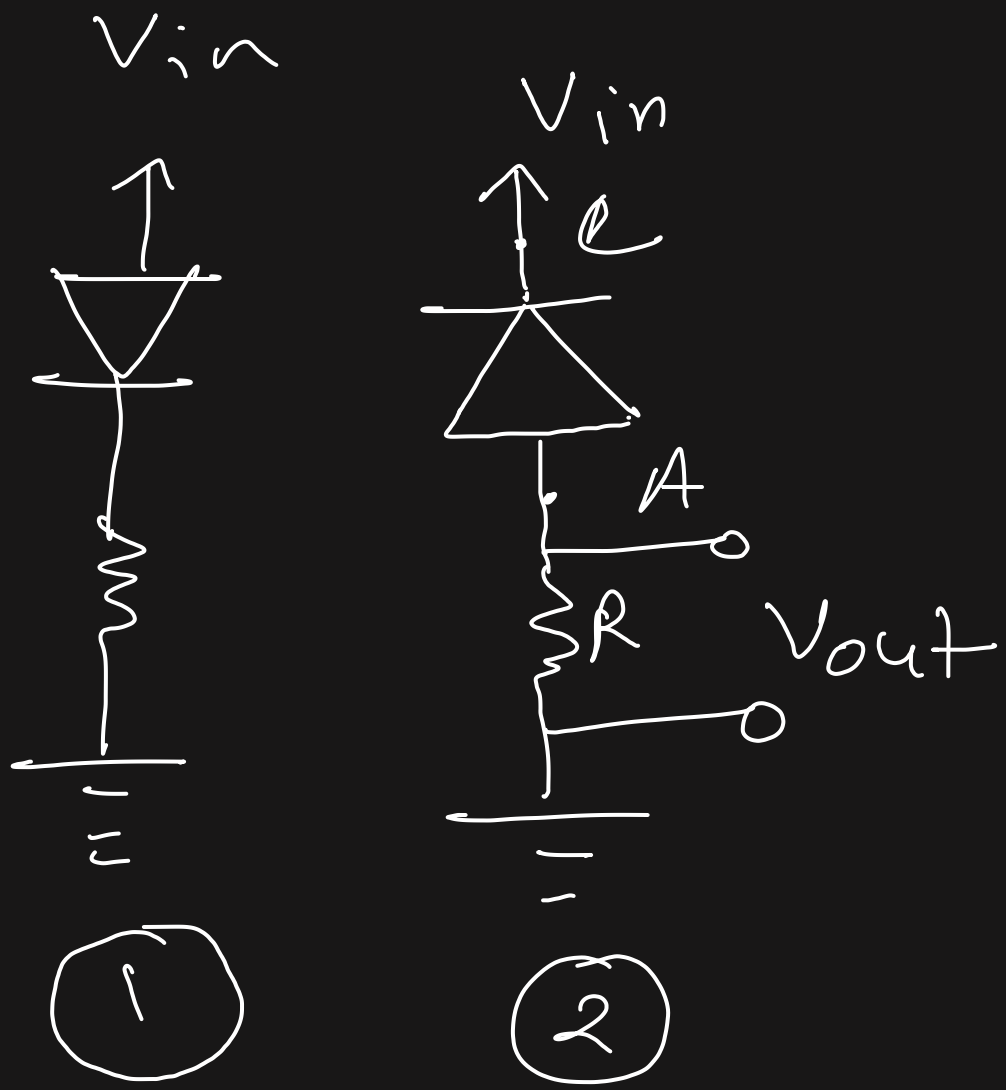
Examples

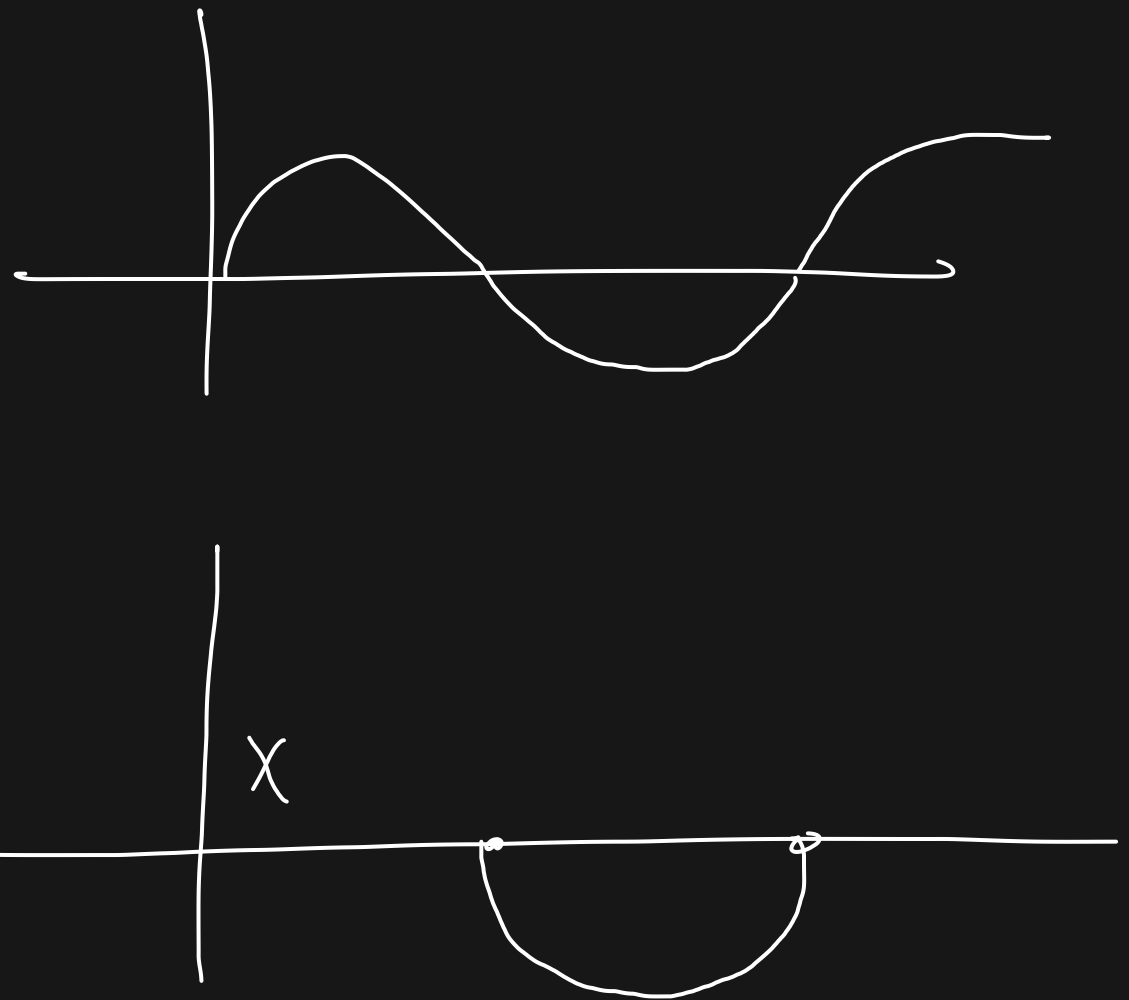
1)





$V_{out} = ?$


Vin
Vin
A
R
Vout
1
2


X