Date: / /

Z-Class

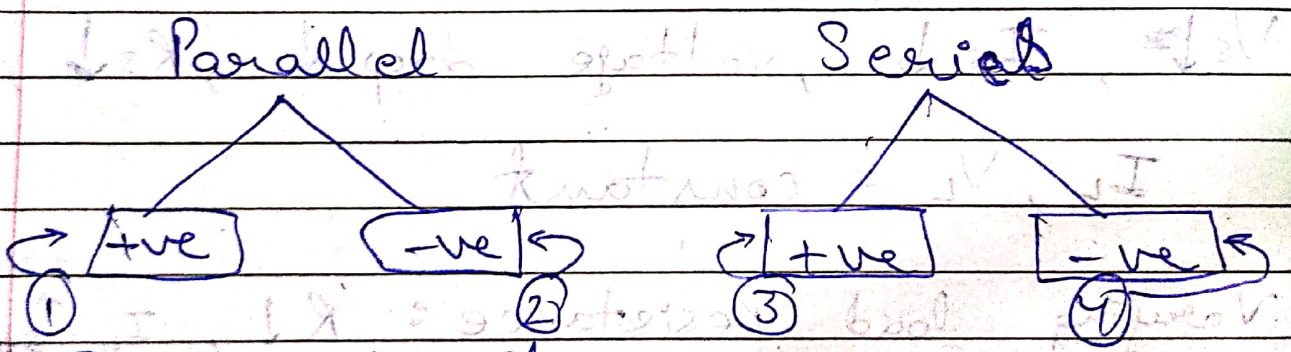
$R_L \uparrow$, $I_L \downarrow$, $I_Z \uparrow$

$I_S R_S$ = constant, V_L = constant

18 August, 2025

Clipper : Clipper circuit prevents output ~~with~~ wave form from exceeding certain limit, at the same time, does not disturb the remaining wave form. It is used in over part of the voltage protection circuit to prevent from high voltage spikes.

Two types :-



5. Parallel Clipper with biasing
6. Serial dipper with biasing

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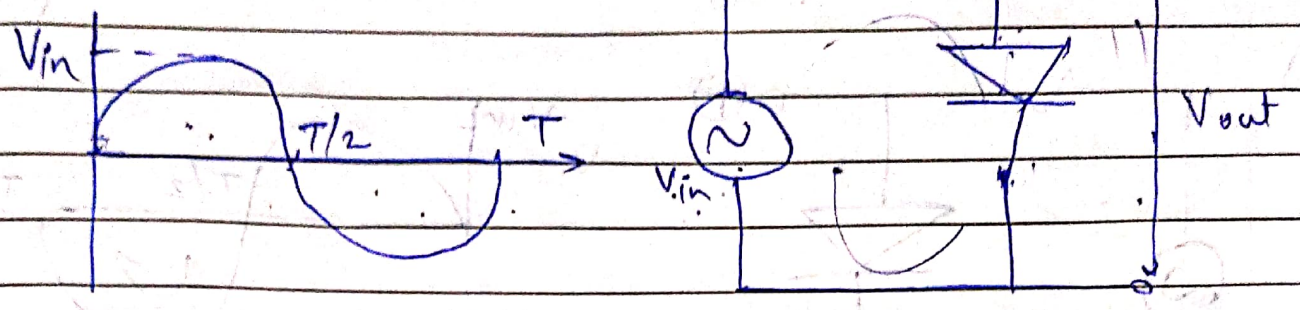
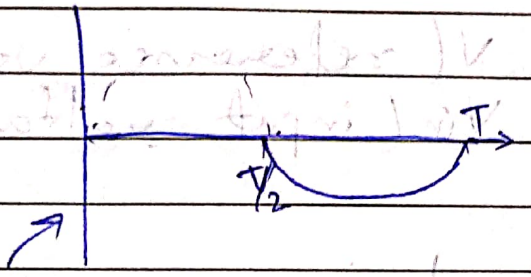
Parallel

(1)

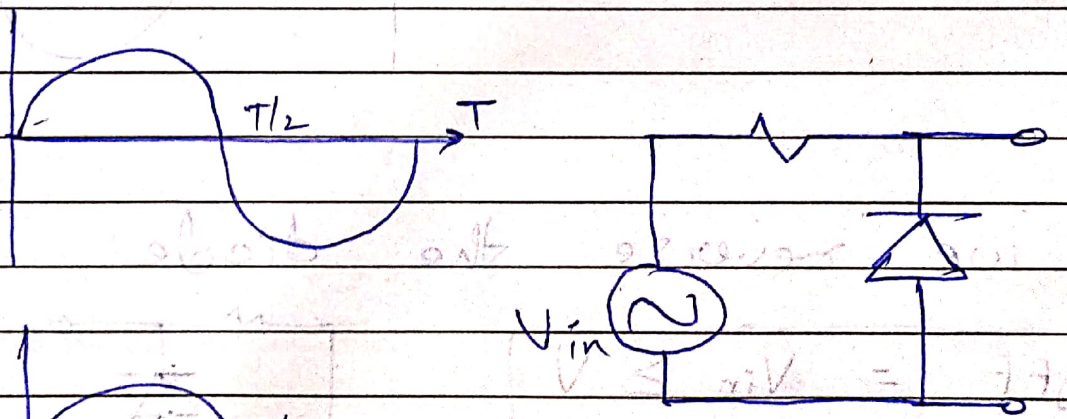


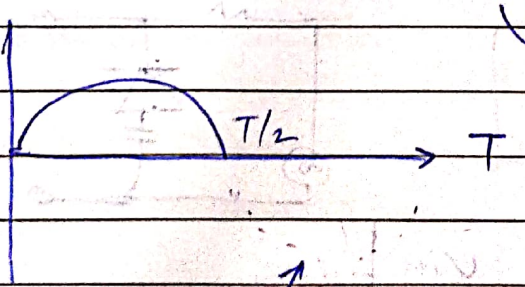


Positive parallel clipper.

positive part gets clipped.

(2)





Negative parallel clipper.

Negative part gets clipped.

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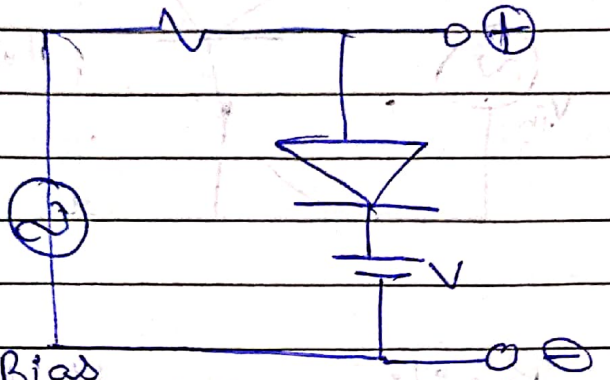
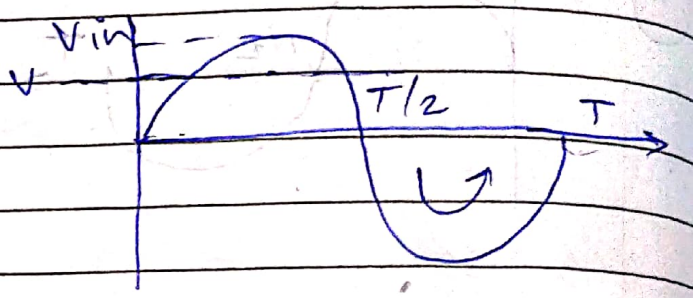
Parallel Clipper with Biasing

(i)

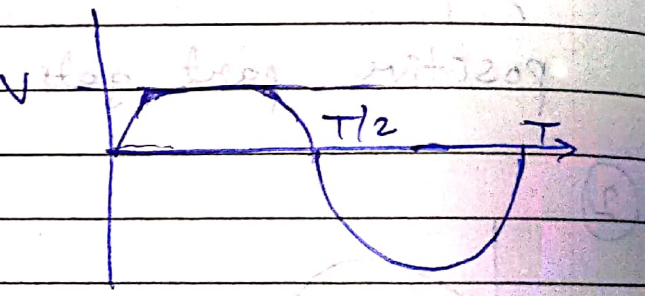




fwd Bias (closed) $\boxed{ON = V_{in} \geq V}$

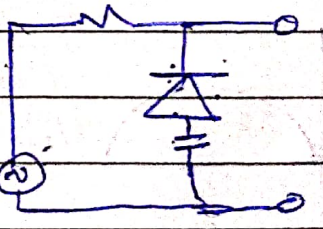
rws Bias (open circuit) $\boxed{Off = V_{in} < V}$

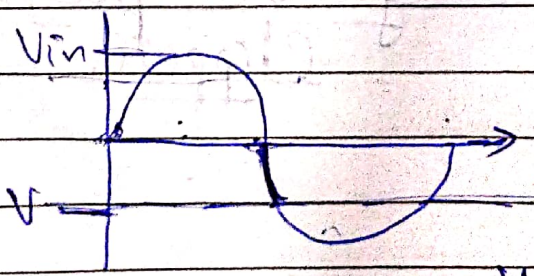
V (reference voltage)
Vin (input voltage)

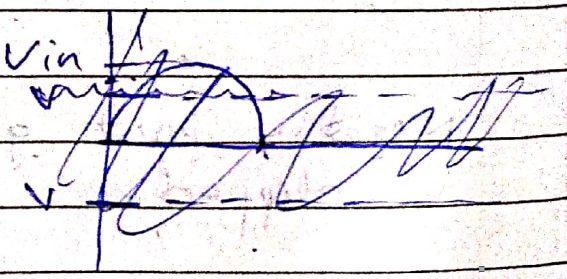


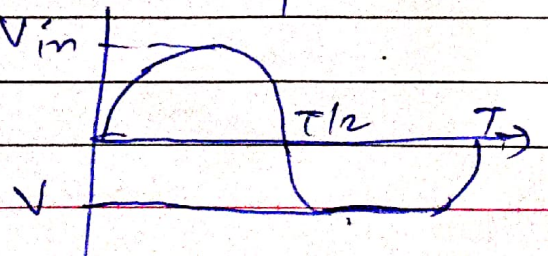
(ii) If we reverse the diode

$\boxed{\begin{aligned} OFF &= V_{in} \geq V \\ ON &= V_{in} < V \end{aligned}}$









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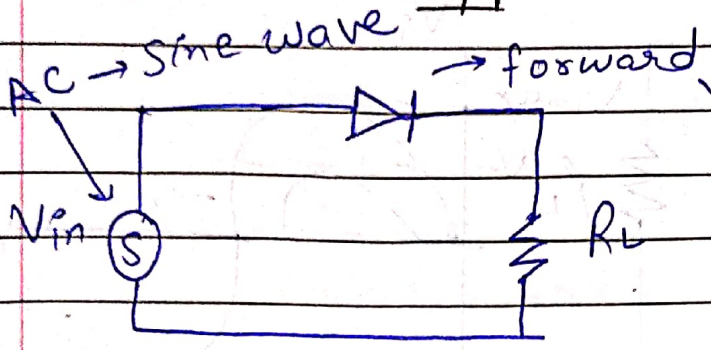
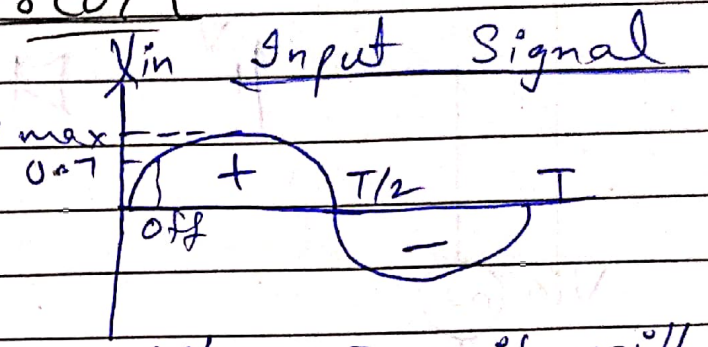
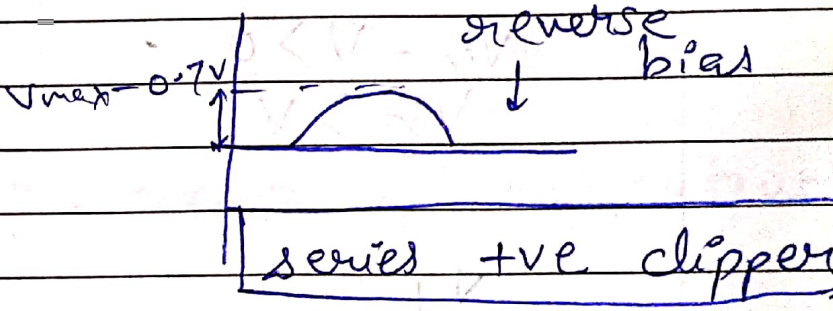
Series Clipper Circuit

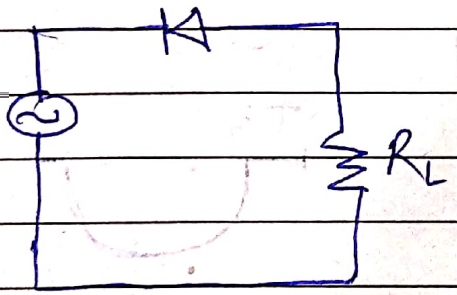




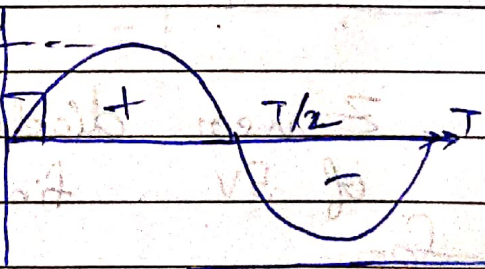
After 0.7 v it will be on



series +ve clipper

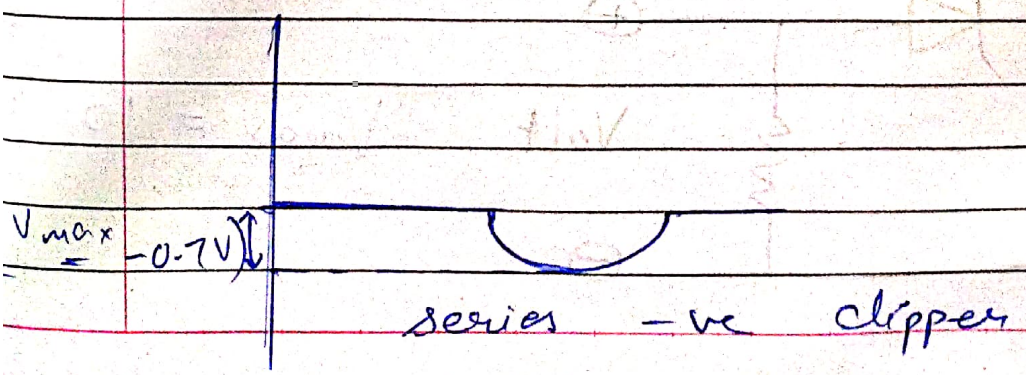


Input signal



0.7 ⇒ threshold voltage

series −ve clipper



series −ve clipper

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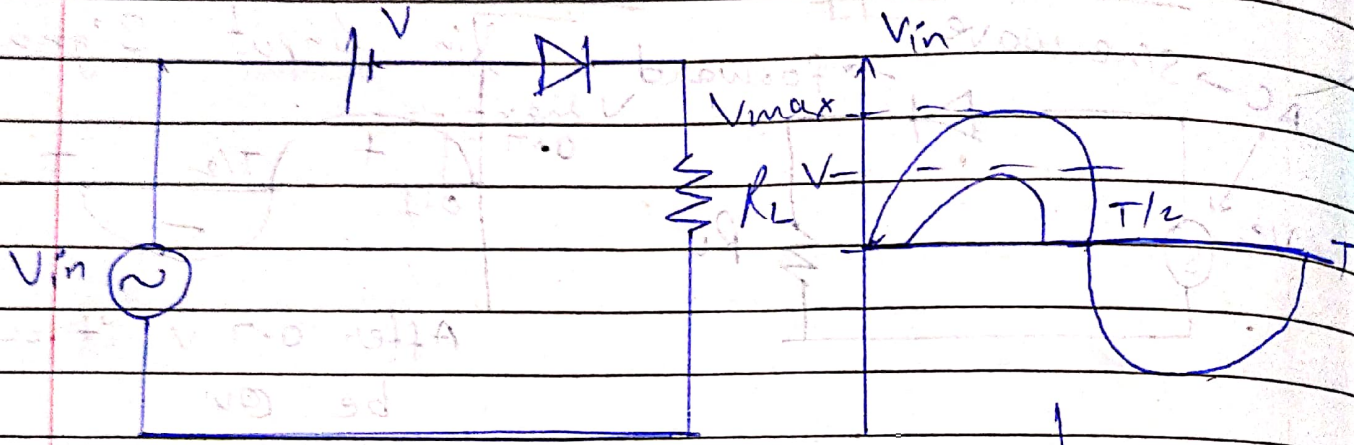
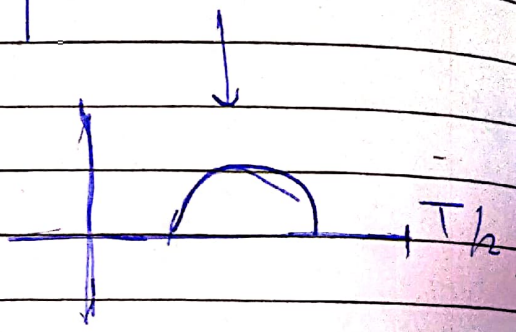
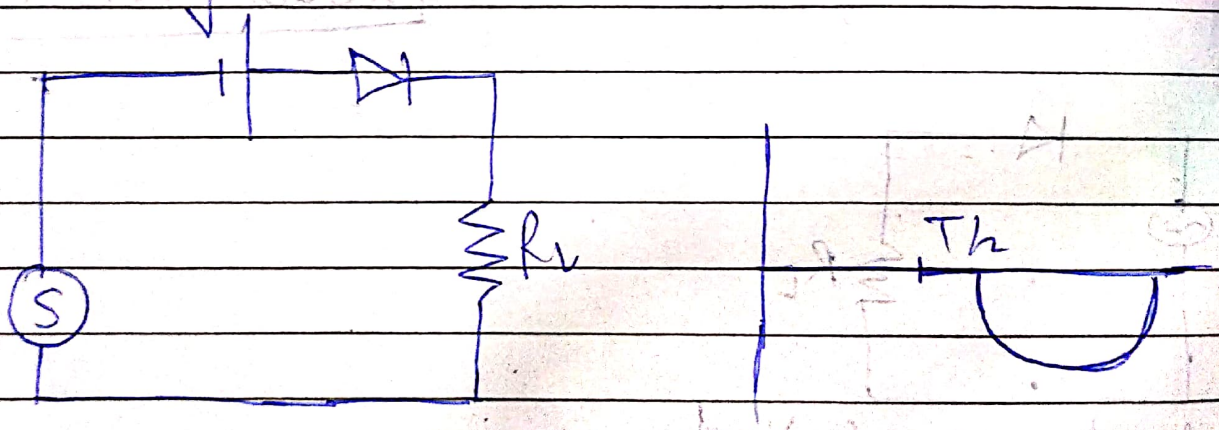
Series Clipper Circuit With Biasing :-



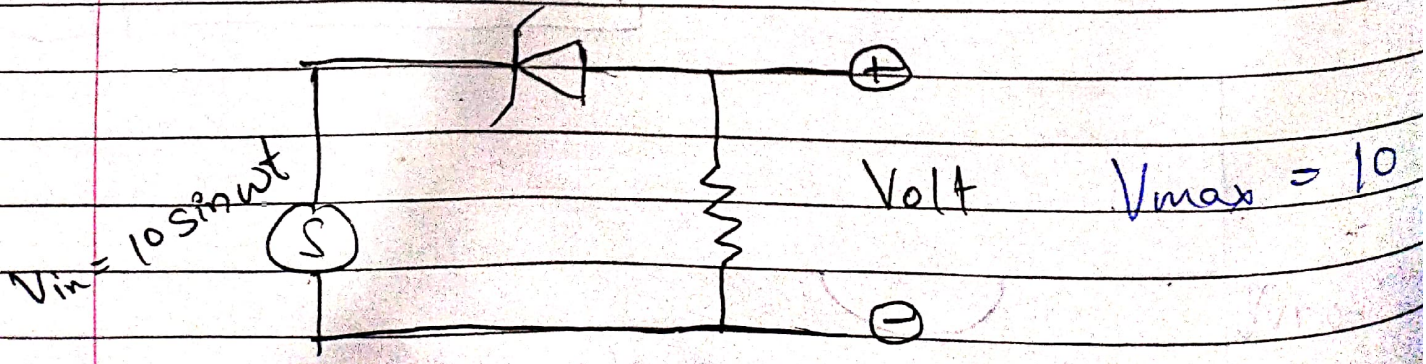
$V_{in} - V > 0$

$V_{in} > V$





Q) Assume Zener diode is ideal breakd voltage of 5V. find the output wave form.



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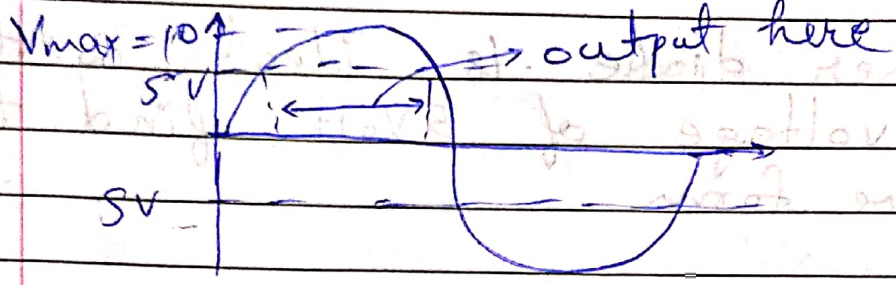
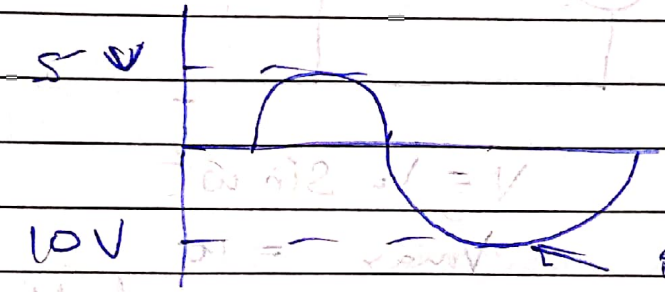


Output wave form :-

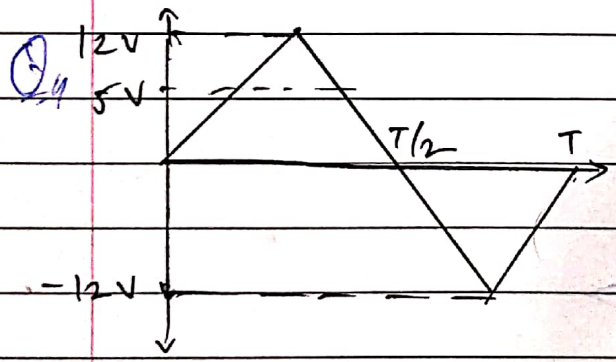


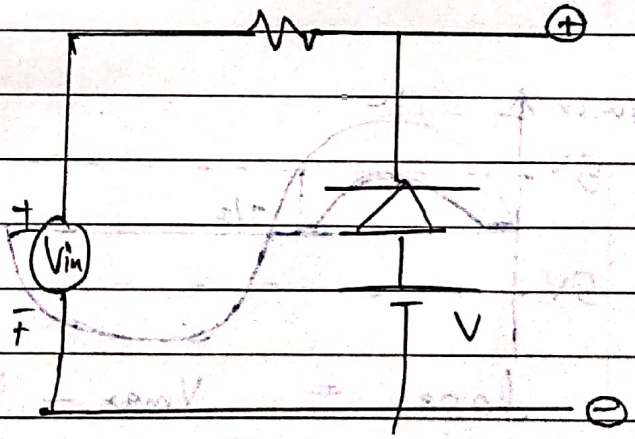
-Ve cycle

$V_{in} < 0$

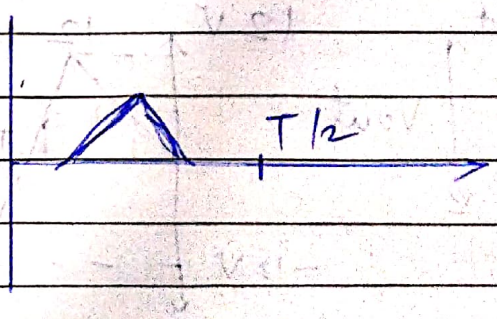
input Voltage = output

Q4





V = 5V



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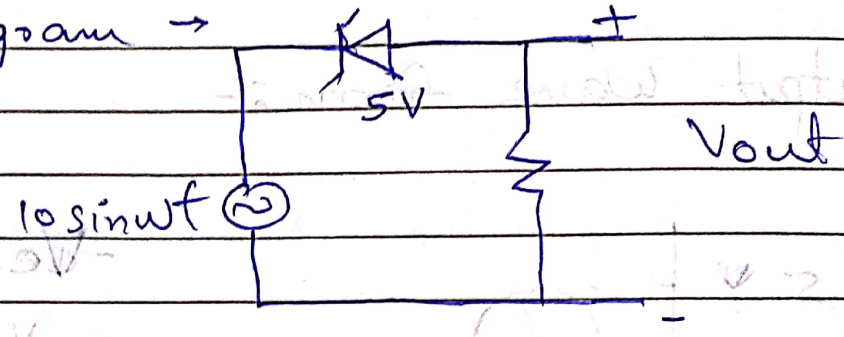
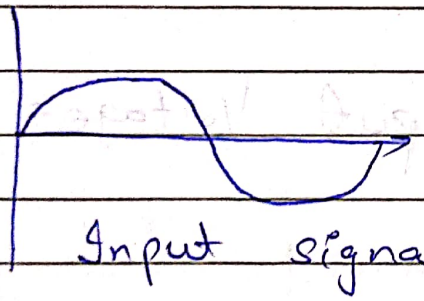
Q. Assume zener diode is ideal with breakdown voltage of 5 Volt, find the output wave form.

given diagram →



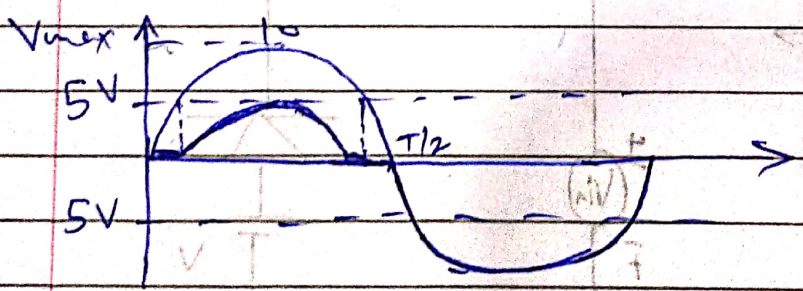


Input signal

$V = V_0 \sin \omega t$

$V_{max} = 10$

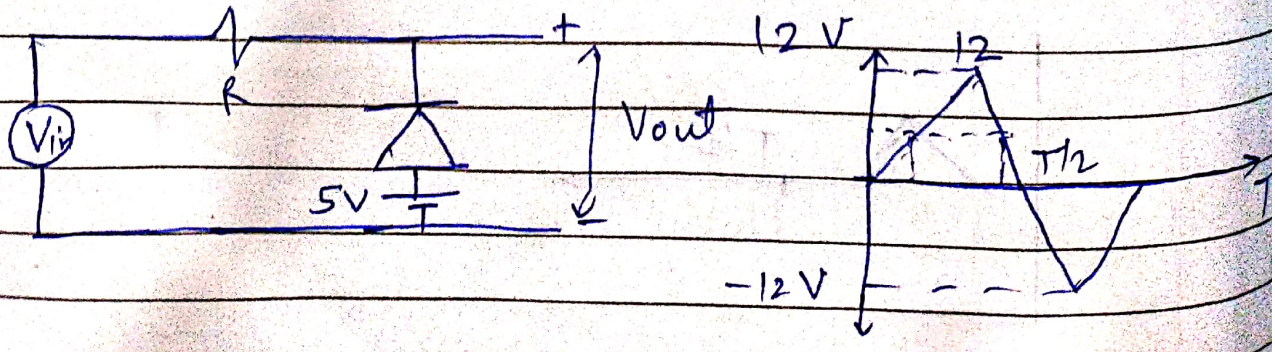
5 volt = half



loss = $V_{max} - V$

= 10 - 5 = 5 Volt

Q.



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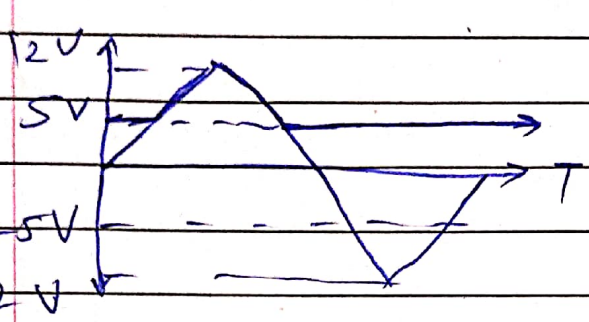

$V_{in} < 5V$, forward bias

$V_{in} > 5V$, reverse bias