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Simulim 22
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2009502 I
Electronics (ECE)

2)

i) When the load is purely resistive, the diodes do not conduct.

ii) The voltage will be $+V_{dc}$ while the ~~input~~ O_1 & O_2 are switched on, whereas it will be $-V_{dc}$ when O_3 & O_4 are switched on.

$V_o = +V_{dc}$ O_1, O_2 on

$-V_{dc}$ O_3, O_4 on

$V_o^2 = |V_{dc}|^2$ both ways

$$V_{RMS} = \sqrt{\frac{\int_0^T V^2 dt}{\int_0^T dt}} = |V| \text{ when } V \text{ const}$$

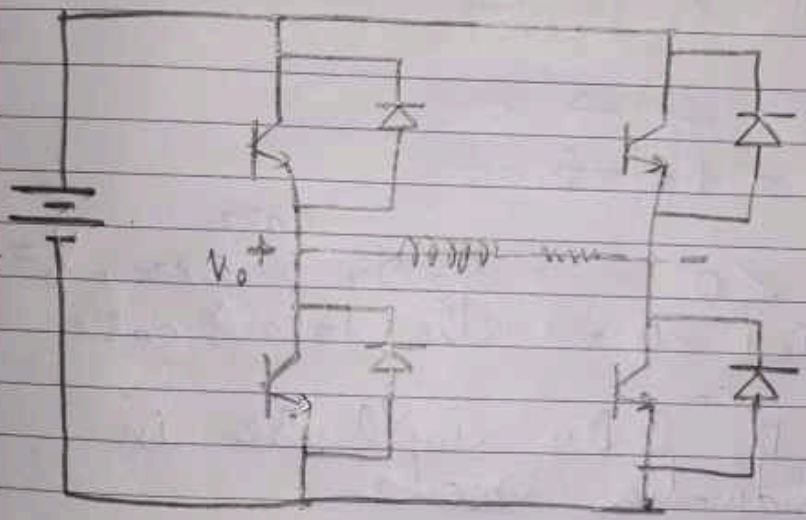
$$\therefore V_{RMS} = \sqrt{\frac{\int_0^{T/3} (+V_{dc})^2 dt + \int_{T/3}^{T} (-V_{dc})^2 dt}{\int_0^T dt}}$$

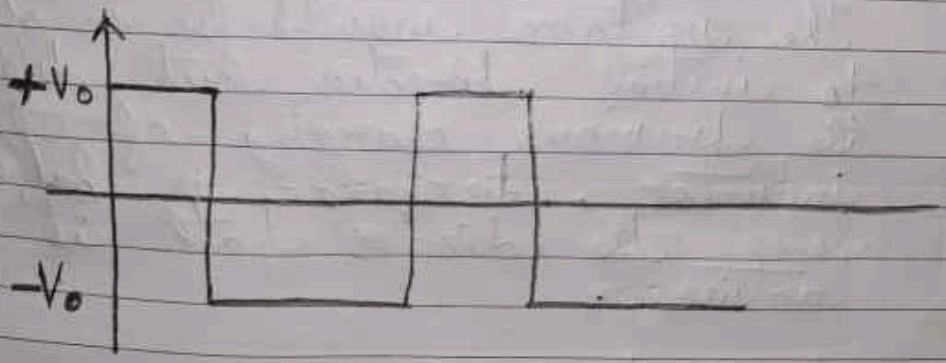
[120° means till T/3]

$V_{RMS} = V_{dc}$

$$\boxed{V_{RMS} = 300\,V}$$

(ii) Now $R = 50\,\Omega$, $L = 10\,mH$

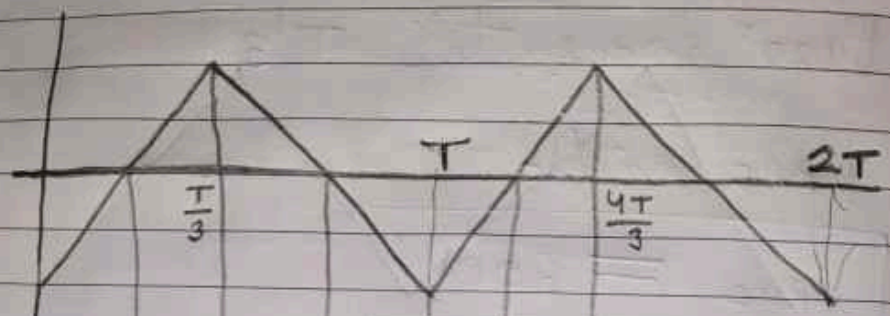




The output voltage is same, as that in case i so

$V_{RMS} = 300V$

(iii)



	D_1	Θ_1	D_3	Θ_3
	D_2	Θ_2	D_4	Θ_4
i	←	→	→	←
V	+-	+-	-+	-+

$V_{out} < 0 \longrightarrow \Theta_3\ \Theta_4$ case, $V_o = -V_{dc}$
& $I_{out} > 0 \rightarrow$ the diodes case

$\therefore$ D_3 & D_4 will be in conduction mode

The voltage would be in off to initial direction but due to the previous charging of the inductor, discharge is happening hence the diodes path is active.

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Electronics