



BAŞKENT UNIVERSITY
ELECTRIC & ELECTRONICS ENGINEERING

EEM 214 ~ ELECTRONICS–I
LABORATORY
PRELIMINARY

Experiment Name : Diode Clipping & Clamping Circuits

Experiment Number : 5

Student Name : [REDACTED]

Student Number [REDACTED]

Experiment Date/Day: 7 / 4 / 2006
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Laboratory Number:

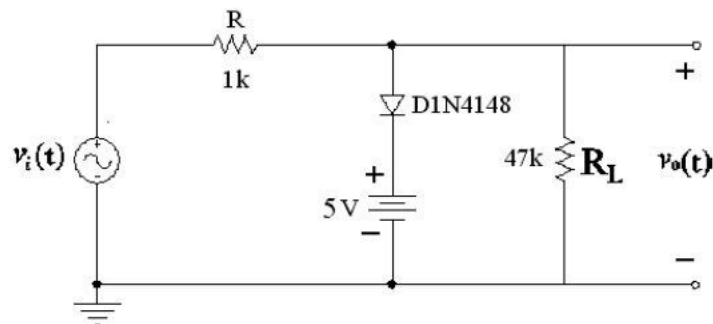
Honor Pledge:

I did this preliminary work or lab report by myself and I have neither cheat from anybody nor let anybody cheat from me at the any part of this work.

Student Signature:

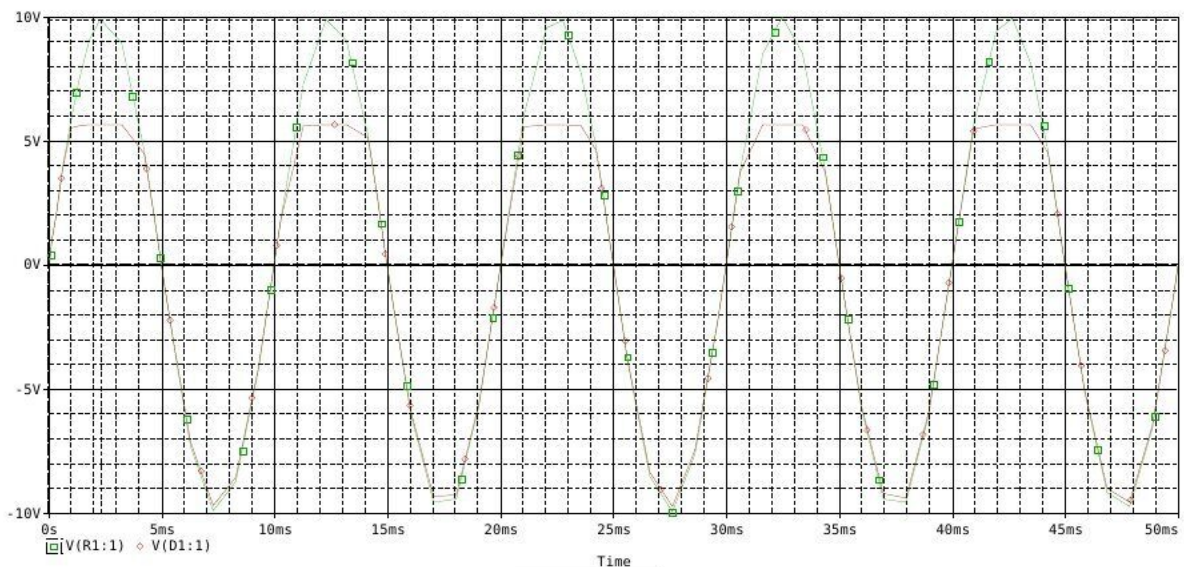
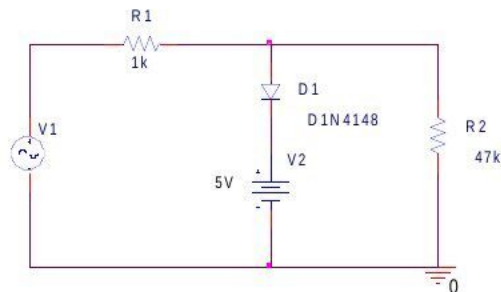
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2-)
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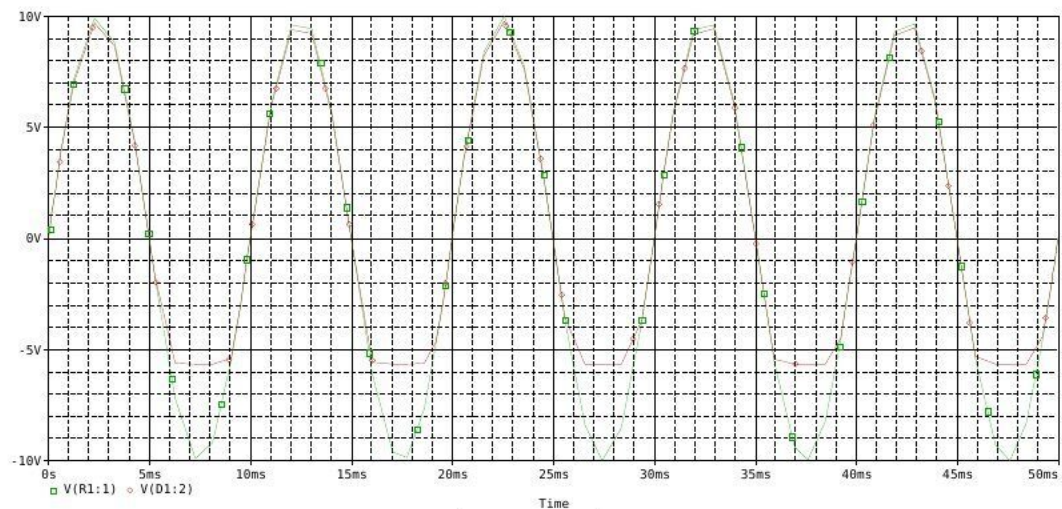
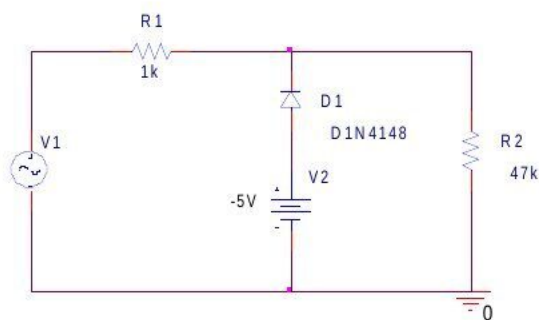


Our input voltage is $V_{in} = 10V_{peak}$, diode will be on when input equals $V_{dc} + V_{diode} = 5 + 0,7 = 5,7V$. So output voltage is equal to input voltage when input is between $0V$ and $5,7V$ range, after $5,7V$ diode would be on, this means current stops flowing across R_L , starts flowing across the diode so the output voltage would be constant $5,7V$. When input is between $0V$ and $-10V$ range, diode is off, so $V_{in} = V_{out}$ in this region.

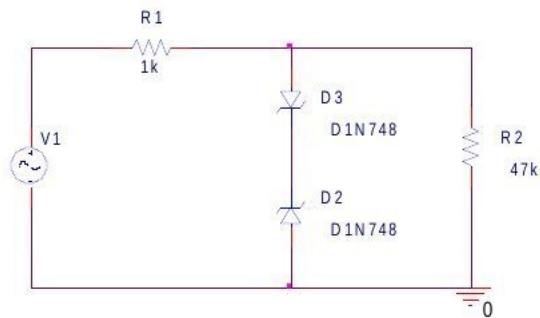
Finally we can say, we clipped output voltage at $5,7V$



b-) When we reverse the diode and the 5V DC source, while input is between 0V and 10V range, diode is off so the output voltage is equal to input voltage. When input is between 0V and -10V range, diode is on after $-5-0,7=-5,7$ V so after this value current will be flow across the diode, it means output is constant $-5,7$ V value.



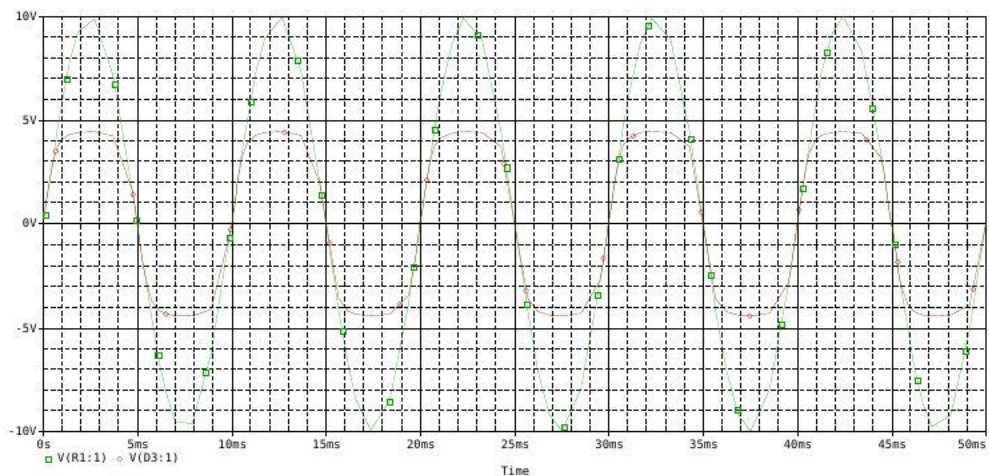
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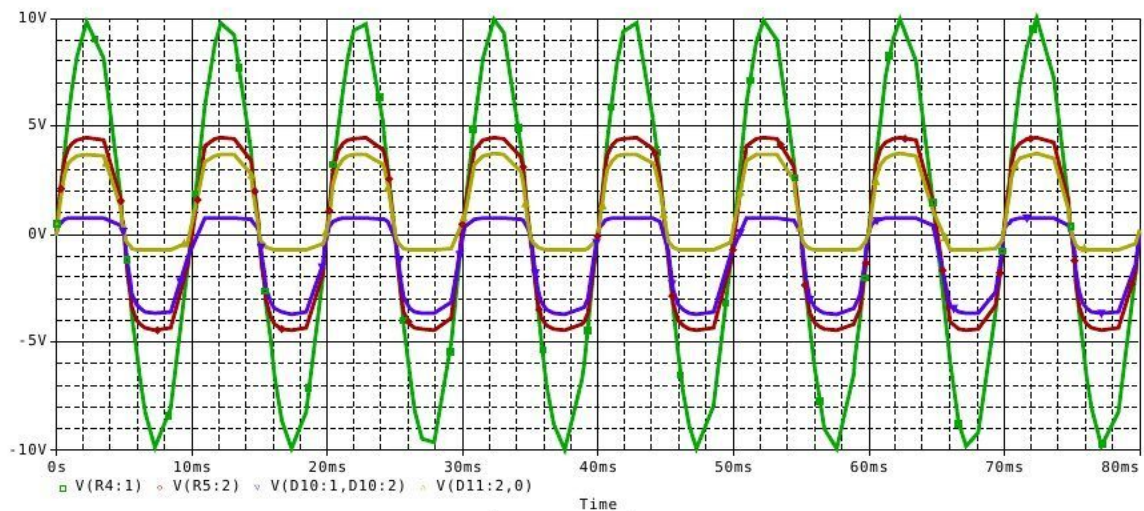
When V_{in} is between 0V and 10V range, the upper zener acts as a diode, the lower is acts as a DC source ($V_z = 3,9\text{ V}$), after $V_z + 0,7\text{ V} = 4,6\text{V}$ upper zener diode is on so the output is clipped to 4,6V.

When V_{in} is between 0V and -10V range, the upper zener is acts as a DC source ($V_z = -3,9\text{ V}$), the lower is acts as a diode, after $-3,9\text{V} - 0,7\text{V} = -4,6\text{V}$, upper zener is on so the output is clipped to the $-4,6\text{V}$ value.

Finally output is clipped between $-4,6\text{V}$ and $+4,6\text{V}$.

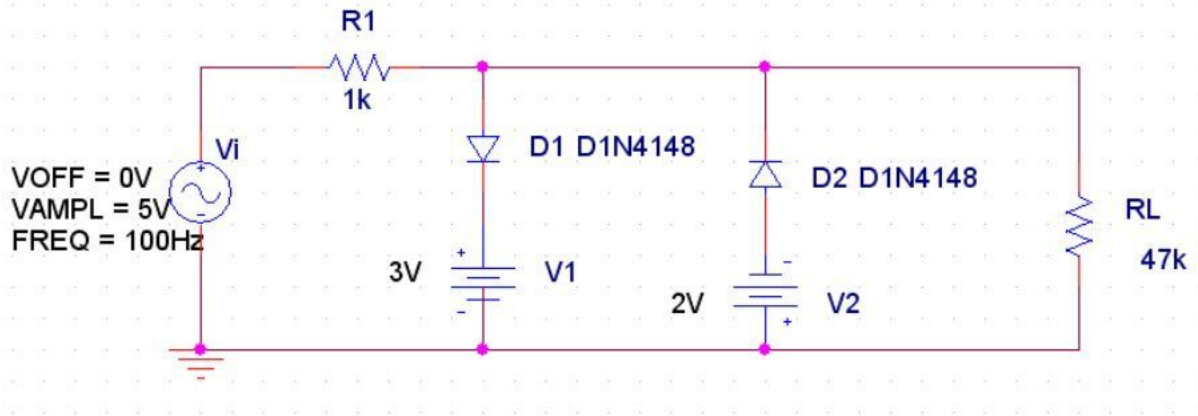


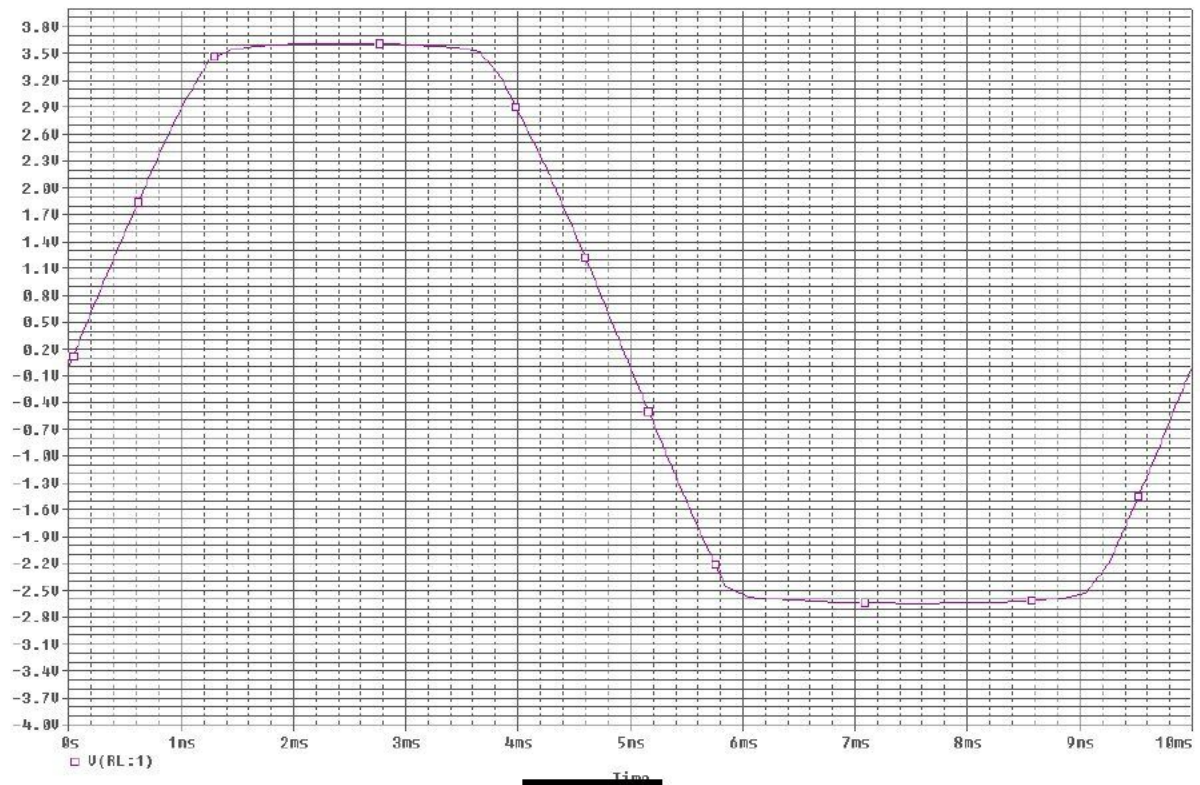
V_{in}, V_{out} and V_{zener}'s



b-) When we reversed zener diodes, output voltage didn't change. Only difference is upper and lower diodes' places.

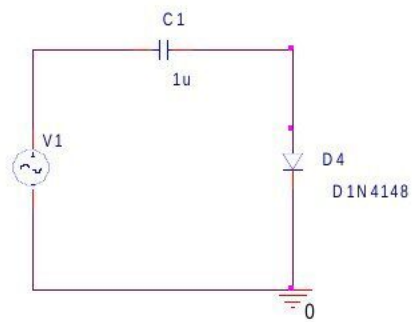
4-)





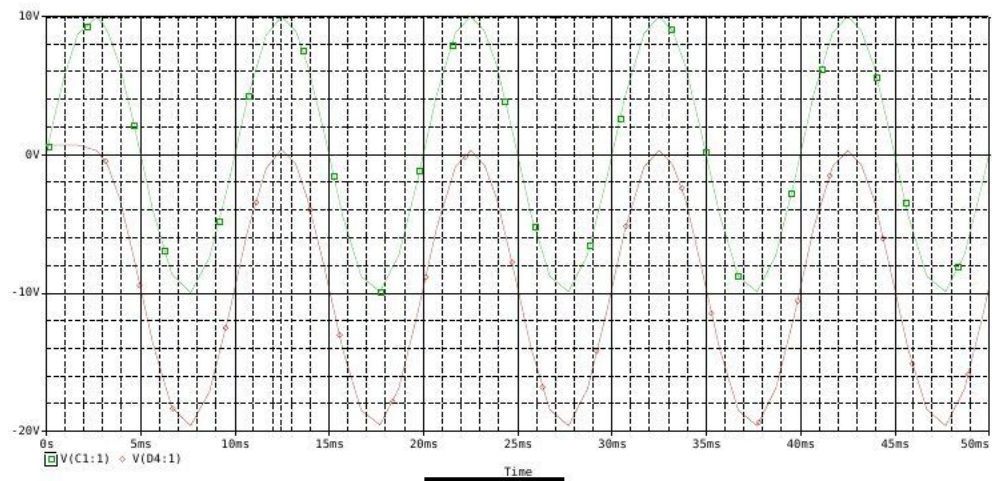
5-)

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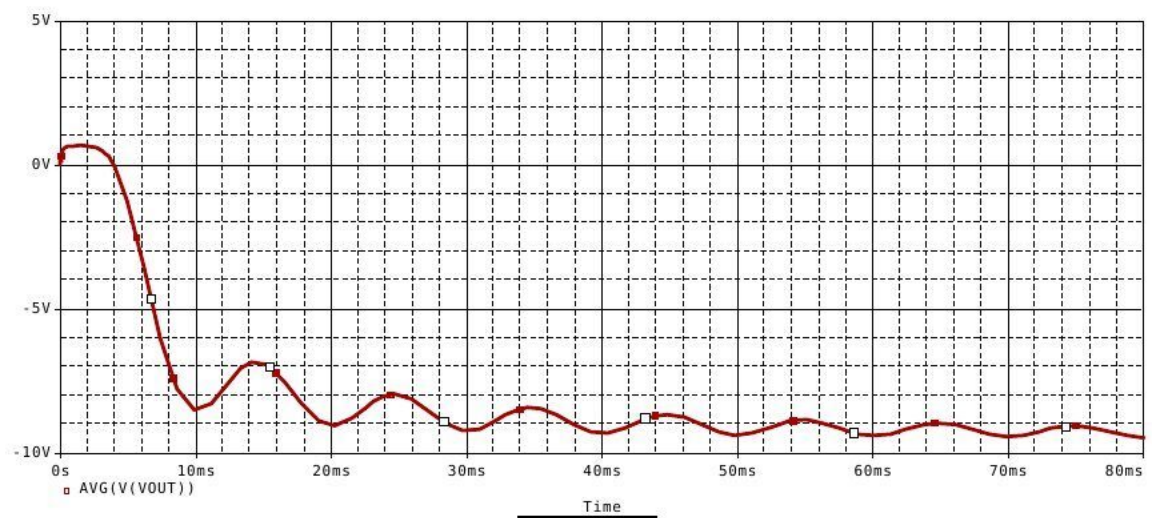


$$\int_T (-10 + v_i(t) + V_{\text{diode}}) dt = -10 + V_{\text{diode}}$$

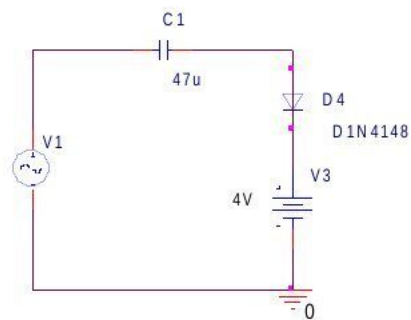
The output voltage is between $-V_p + V_{\text{diode}} = -10 + 0.7 = -9.3 \text{ V}$ and 0 V

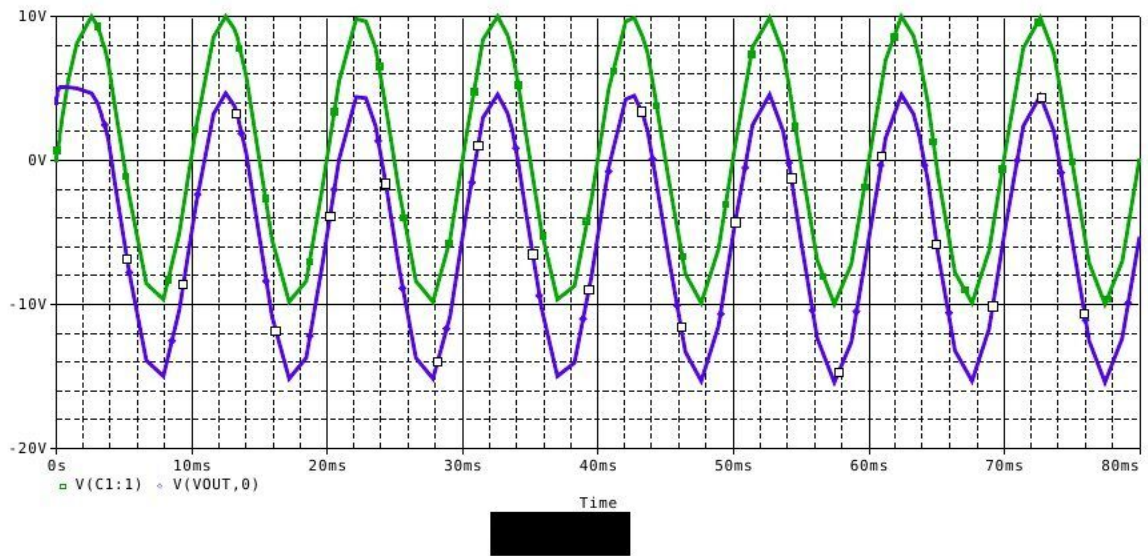


DC(average)

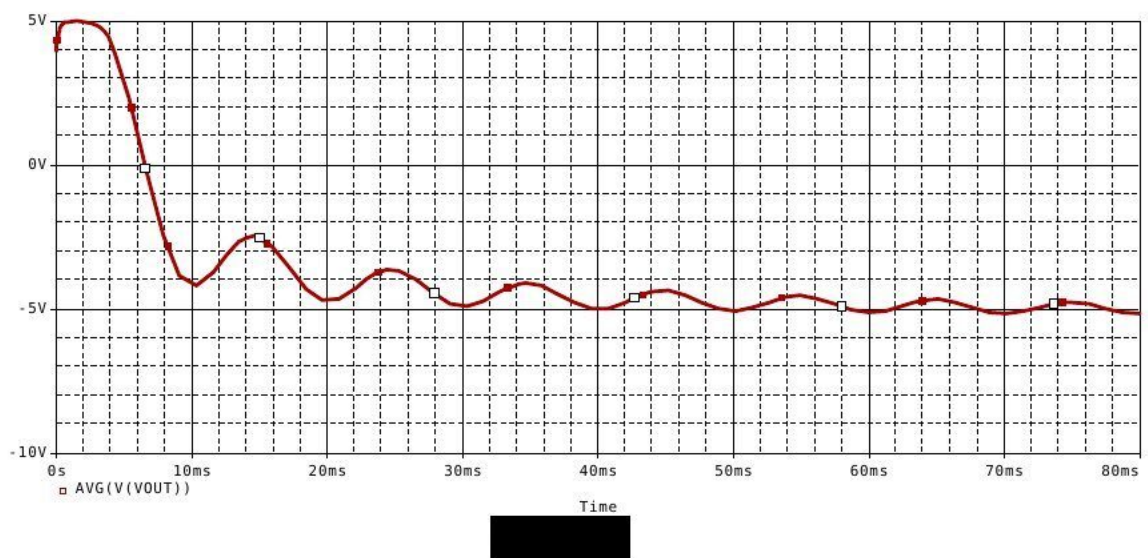


b-)

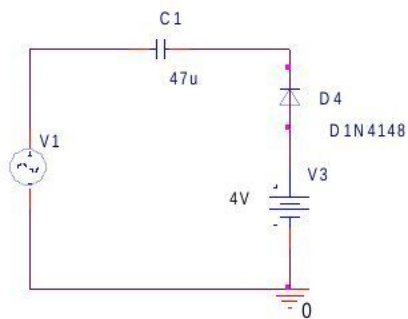


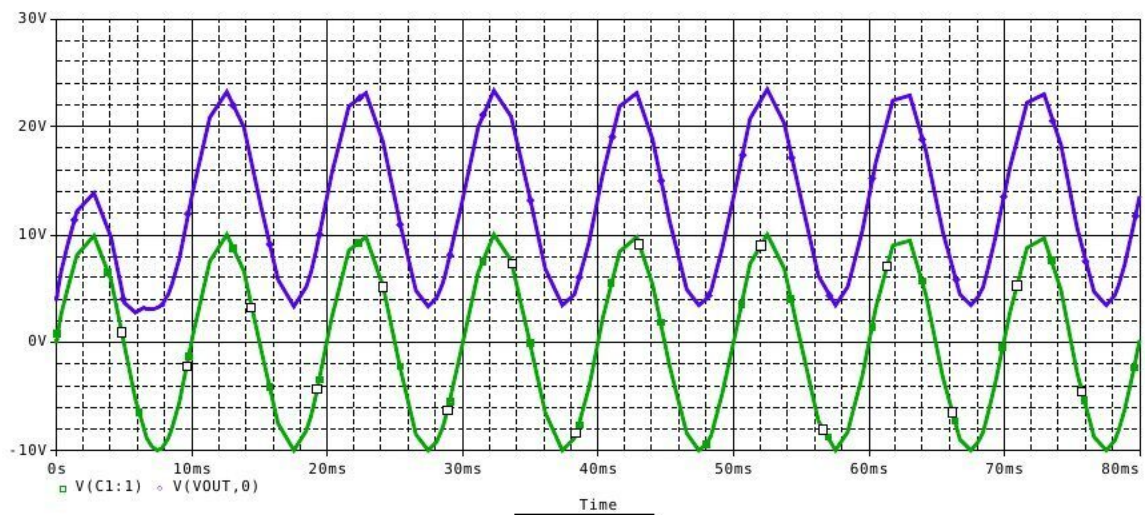


DC(average)

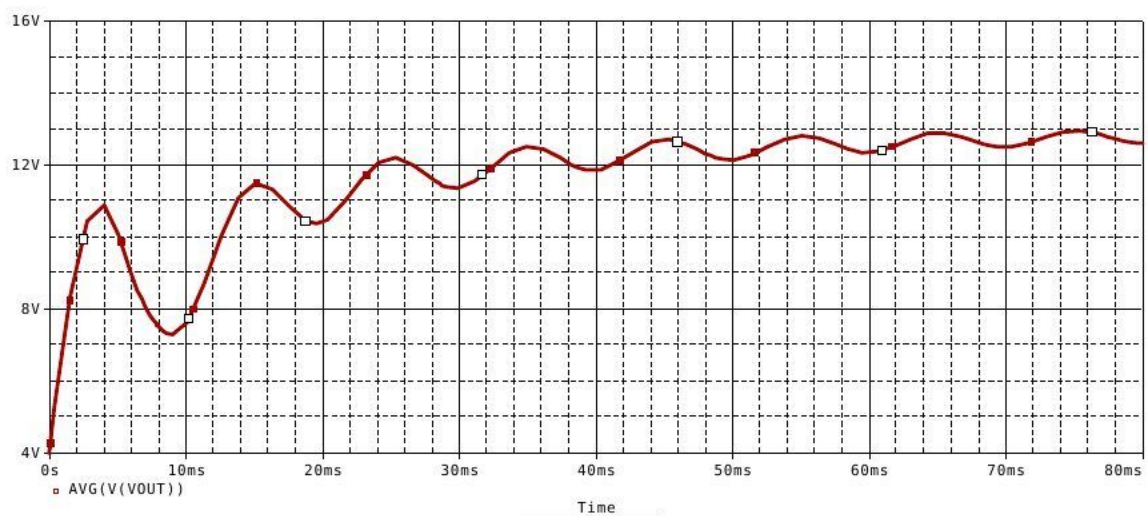


c-)





DC(average)



6-)

