Exp.7: Clamping Circuits

1- ***Objectives:***

- To become familiar with the function and operation of clampers.

2-***Circuit elements:***

- Function generator.
- Oscilloscope.
- Silicon diode.
- Resistor 10 KΩ.
- Capacitor 1μF.
- DC. Power supply unit (1.5 V).

3-***Procedure:***

Part 1: Clampers (Effect of R)

1- Determine the time constant (τ =RC) for the network of fig 1.

(calculated) τ = _____

5τ = _____

2- Calculate the period of the applied signal and then determine half the period.

(calculated) T = _____

T/2= _____

3- Using the result of 5τ and compare to T/2.

Part 2: Clampers (R, C, diode combination)

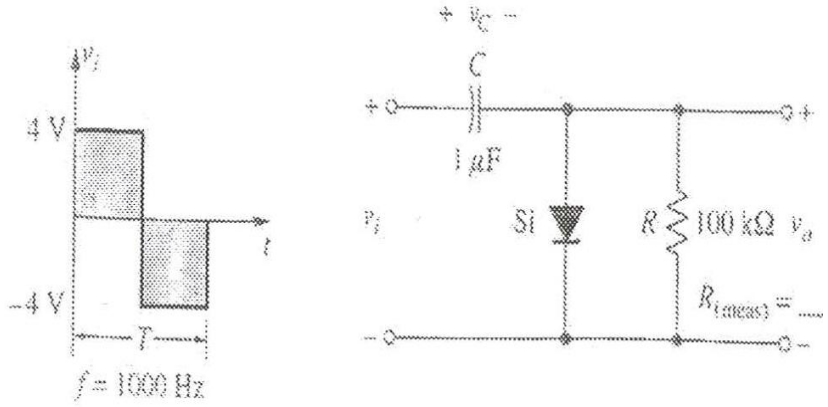


Fig 1

1- Connect the circuit as shown in figure 1. Note that the input is an 8 V_{p-p} square wave at a frequency of 1000 Hz.

2- Calculate the voltage V_C and V_o when the applied square wave is +4 V.

(Calculated) V_C = _____

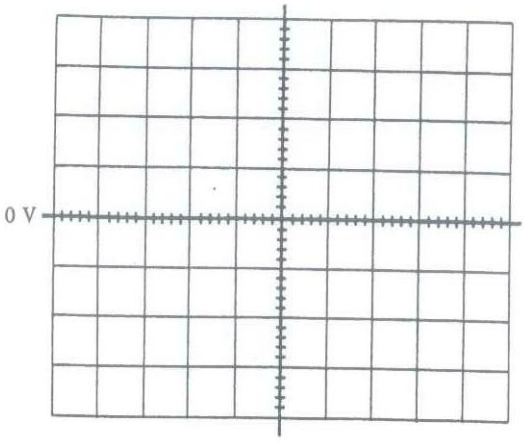
(Calculated) V_o = _____

3- Repeat (2) when the applied square wave is -4 V.

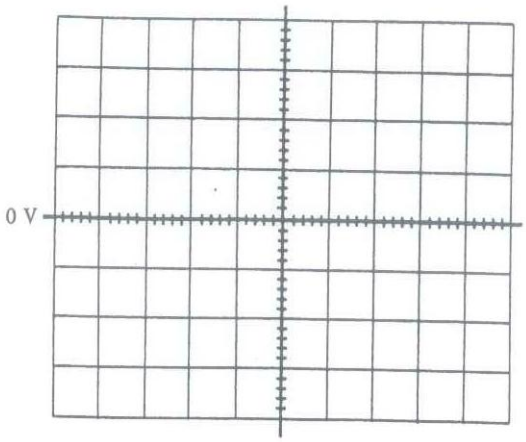
(Calculated) V_o = _____

4- Sketch the expected waveform for V_o .

Calculated:



Measured:



5- Compare with the predicted results.

6- Reverse the diode of fig 1, and calculate the level of V_C and V_o when V_i = +4 V.

(Calculated) V_C = _____

(Calculated) V_o = _____

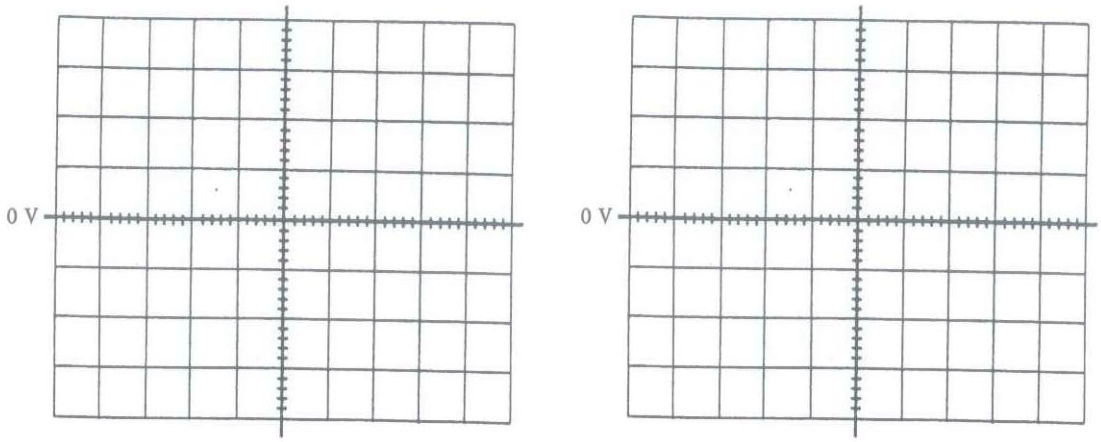
7- Repeat (6) when the applied square wave is -4 V.

(Calculated) V_o = _____

8- Sketch the expected waveform for V_o .

9- Compare with the predicted results.

Calculated: Measured:



Part 3: Clampers with a DC battery

1- Connect the circuit as shown in figure 2. Note that the input is a 8 V_{p-p} square wave at a frequency of 1000 Hz.

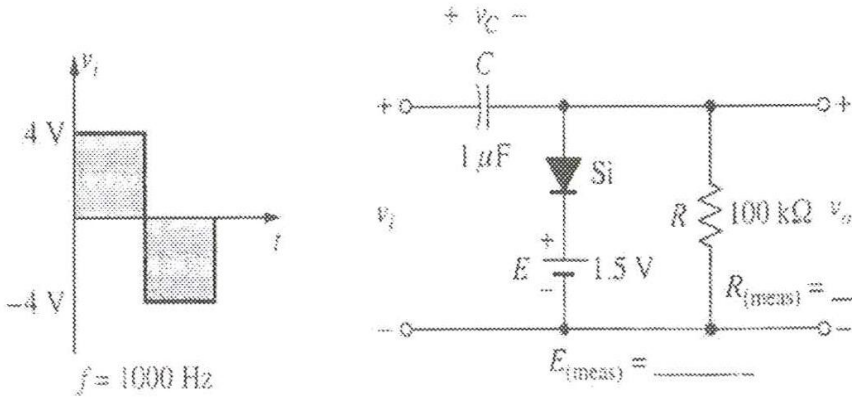


Fig 2

2- Calculate the voltage V_C and V_o when the applied square wave is +4 V.

(Calculated) V_C = _____

(Calculated) V_o = _____

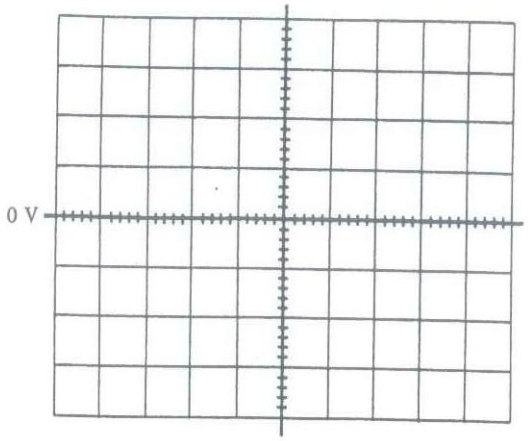
3- Repeat (2) when the applied square wave is -2 V.

(Calculated) V_o = _____

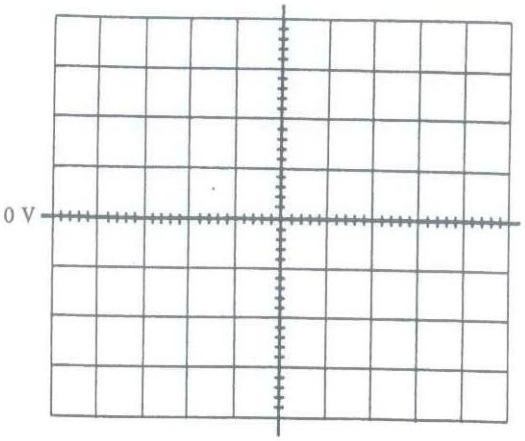
4- Sketch the expected waveform for V_o .

5- Compare with the predicted results.

Calculated:



Measured:



1- Reverse the battery of fig 2, and calculate the level of V_C and V_o when V_i = +4 V.

(Calculated) V_C = _____

(Calculated) V_o = _____

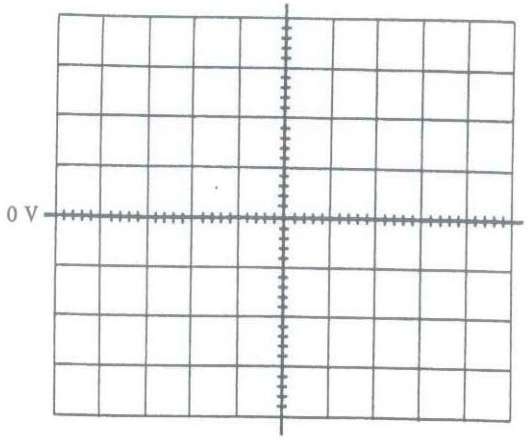
2- Repeat (6) when the applied square wave is -4 V.

(Calculated) V_o = _____

3- Sketch the expected waveform for V_o .

4- Compare with the predicted results.

Calculated:



Measured: