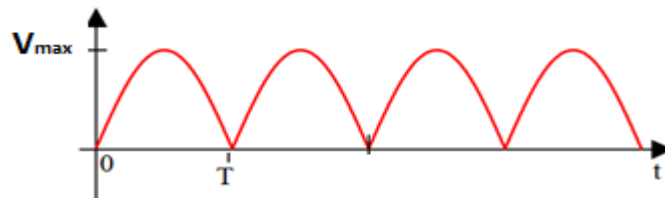


Lab N 04 : Stabilized power supply and zener diode

1. Double-wave rectification (with Graetz bridge):

1.1 Theoretical part:

The double-wave rectification of an alternating signal $V(t) = V_{\max} \sin(\omega t)$ gives the signal $U_d(t)$ represented by the following figure:



1. Find the mathematical expression for the average value $U_{d \text{ avg}}$:

.....

A.N : $U_{d \text{ avg}} = \dots \dots \dots$

2. Calculate mathematically the effective value $U_{d \text{ eff}}$:

.....

N.A : $U_{d \text{ eff}} = \dots \dots \dots$

1.2 Practical part (double-wave rectifier circuit or Graetz bridge):

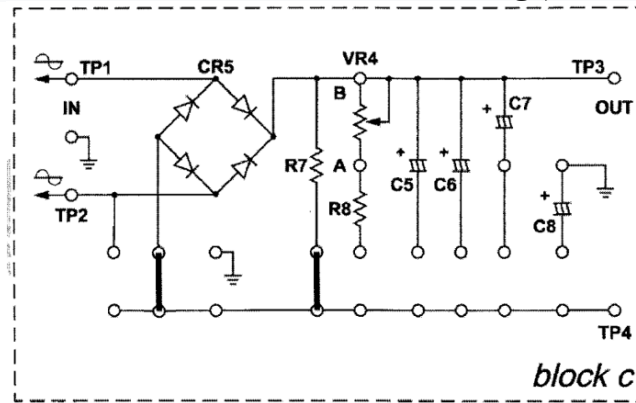
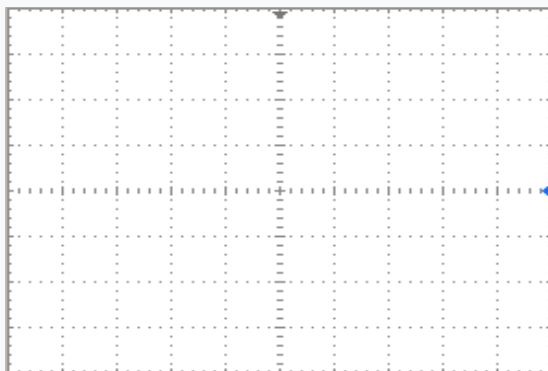


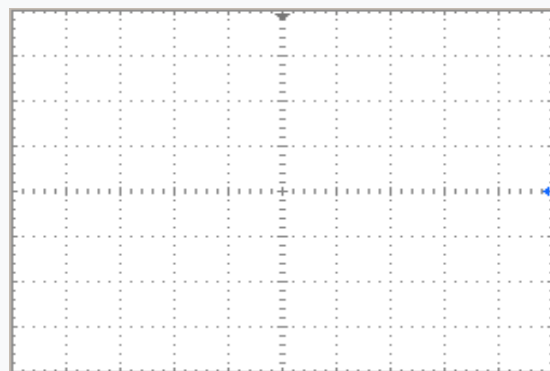
Fig. 23002-block c.2

A. Handling:

1. Insert the connecting clips according to Fig. 23002-block c.2
2. Apply an alternating current source of $V_{pp} = 18V$ between terminals TP1 and TP2.
3. Plot only the voltage V_{out} (CH2) in AC and DC mode. (i.e. unplug CH1)
4. Measure V_{out} using the multimeter in AC and DC mode (Table 3).
5. Complete the Table (3)



AC mode



DC mode

Important note: To stabilize the signal, press “trigger Menu” then choose “Source: CH2” and adjust with LEVEL

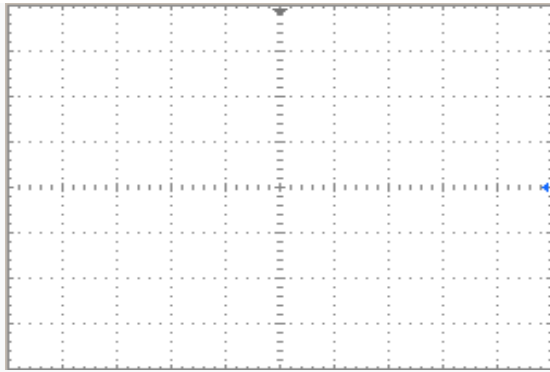
Table (3)

	Average Value (DC)	Effective value (AC)
Multimeter		
Oscilloscope		
V_{max}		
Calculation		

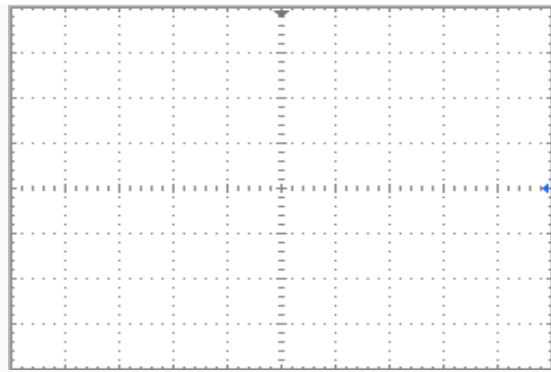
Compare the frequency of the rectified signal with that of the input signal

B. Filtering by capacitors:

Connect a capacitor $C=1\mu F$ then C6 and draw the graphs obtained in DC mode:



C1



C6

	C=1 μ F	C6
V_{avg} (DC mode)		
V_{eff} (AC mode)		

Give your conclusion

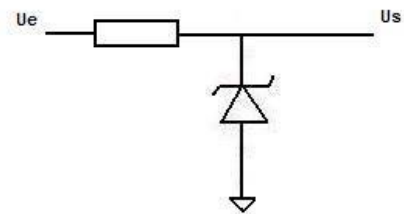
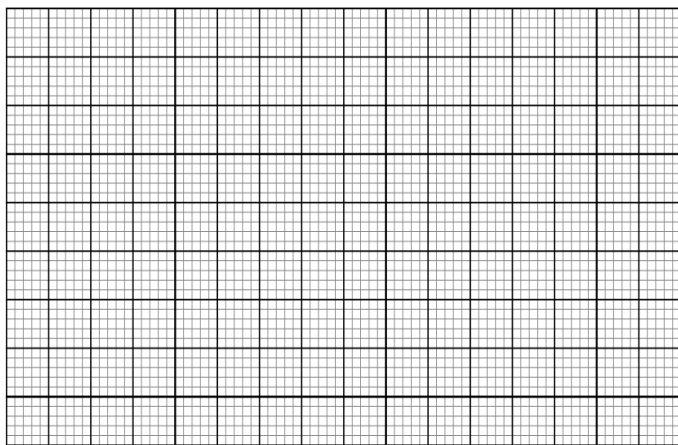
	Signal type	Frequency
Double wave	DC et AC	
After filtrng	DC	

2. Characteristic of the Zener diode

Test and verify the diode with the multimeter in ohmmeter mode (sign of the diode).

Carry out the following assembly and fill in the table:

Ue (V)	-10	-9	-7	-6	-5	-4	-3	-2	-1	0	0.5	1	2	3	4	5
V_D (V)																
I_D (μ A/mA)																



Draw the characteristic of the diode: $I_D = f(V_D)$

How much are the thresholds voltages in forward and reverse directions (from the graph)?

.....

compare the characteristics of the classic diode and that of the zener diode

.....