Electronic Circuits I – Laboratory 04

Special purpose diodes

#	Student ID	Student Name	Grade (10)	Instructor signature
1				
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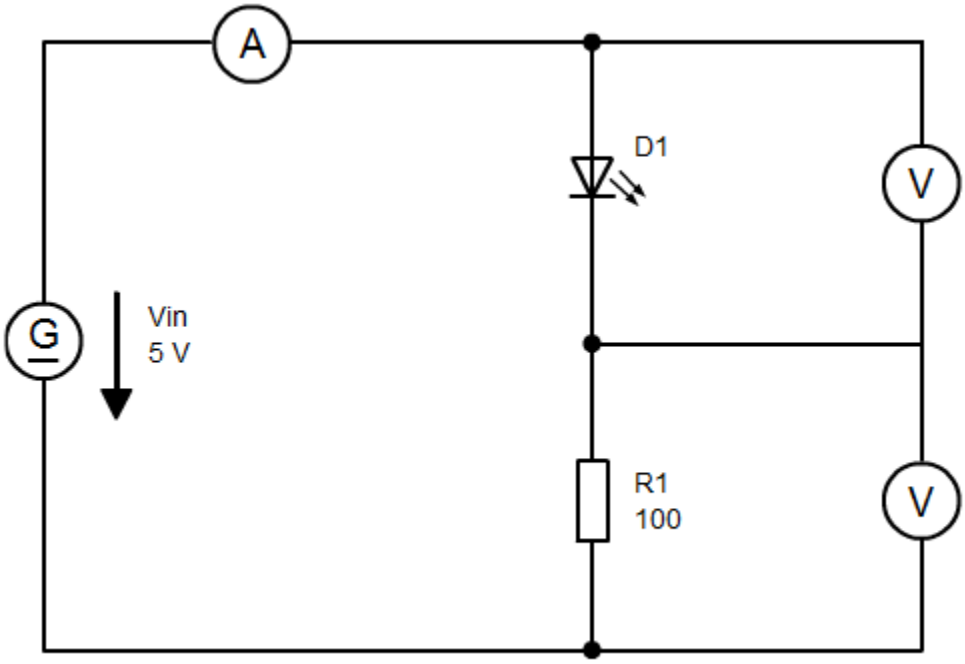
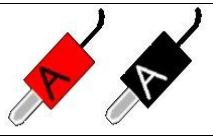
Delivery Date	

Part 1, Light emitting diode



Equipment

The following equipment is needed for this experiment and should be configured as shown:

<table>
<tr><th>Equipment</th><th>Settings</th></tr>
<tr><td>  </td><td>
<table>
<tr><td>Black lead</td><td>Ground</td></tr>
<tr><td>Red lead</td><td>400 mA input</td></tr>
<tr><td>Selector knob</td><td>mA =</td></tr>
<tr><td>  </td><td>Plug the red and black leads into the sockets indicated</td></tr>
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<table>
<tr><td>Positive input</td><td>A+</td></tr>
<tr><td>Negative input</td><td>A-</td></tr>
<tr><td>Selector knob</td><td>RMS</td></tr>
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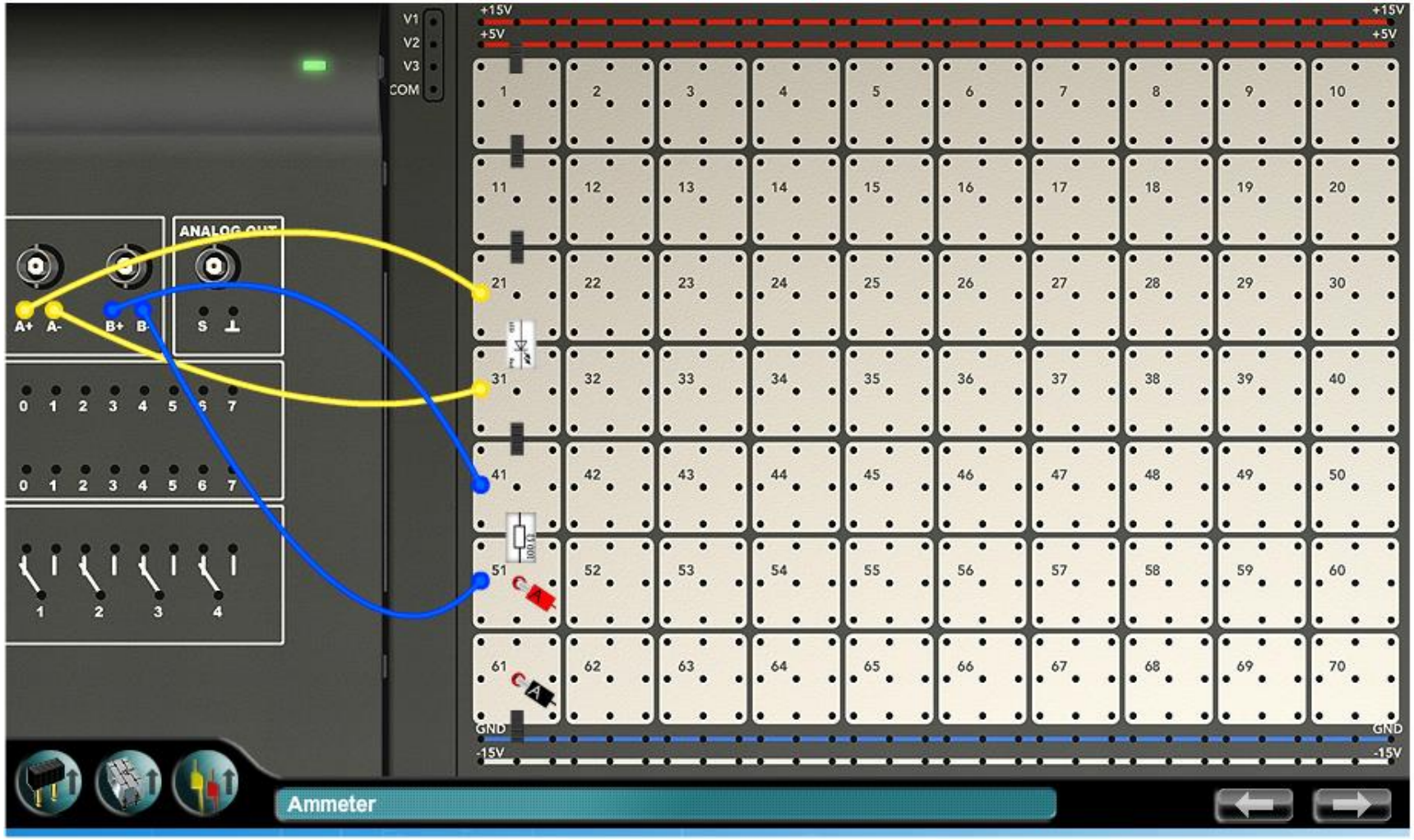
Experiment set-up



Experiment procedure and exercises

- Calculate the current from the voltage drop across the resistor using Ohm's law. Place the following components on the Experimenter one after the other: first the LEDs (red and green), then the germanium diode (Ge AA118), then the silicon diode (1N4007) and lastly the zener diode (ZPD 4.7). In each case, measure the threshold voltage for the various types of LEDs or diodes. To do this, place the diode in position and enter the voltage drop across the diode as well as the current.

Start by measuring voltage and current for the red LED.

V_T (V)	
I_T (mA)	

Now insert the green diode in the diode position. Measure the voltage and current and enter these values below.

V_T (V)	
I_T (mA)	

Now put the germanium diode in position. Measure the voltage and current and enter these values below.

V_T (V)	
I_T (mA)	

Now put the silicon diode in position. Measure the voltage and current and enter these values below.

V_T (V)	
I_T (mA)	

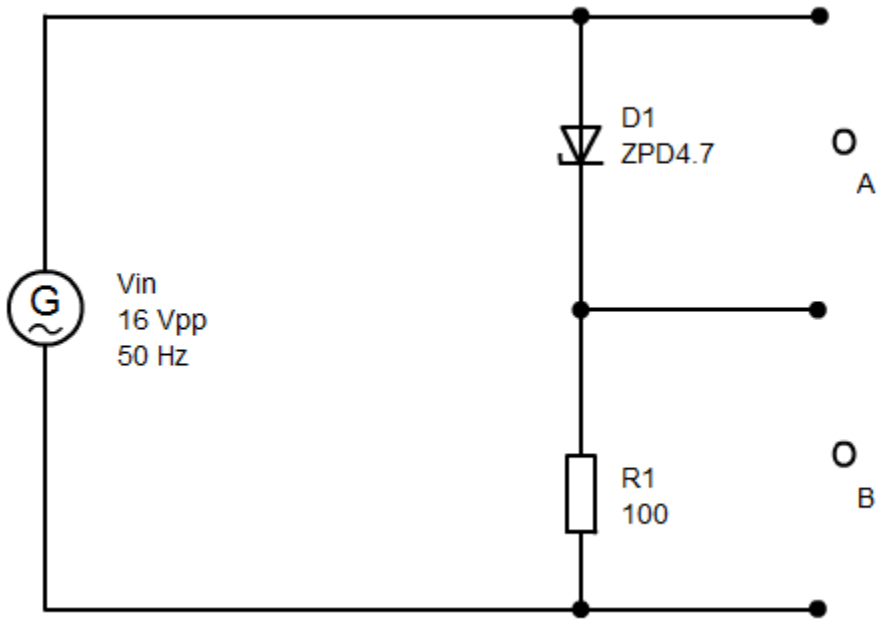
Now put the zener diode in position. Measure the voltage and current and enter these values below.

V_T (V)	
I_T (mA)	

Part 2; Zener diode

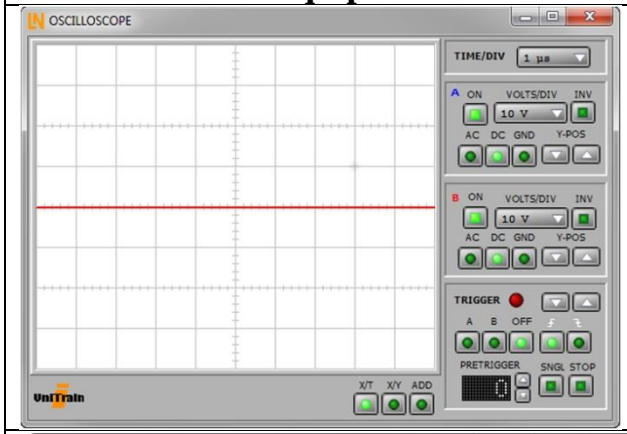
Circuit diagram

This experiment is based on the following circuit:

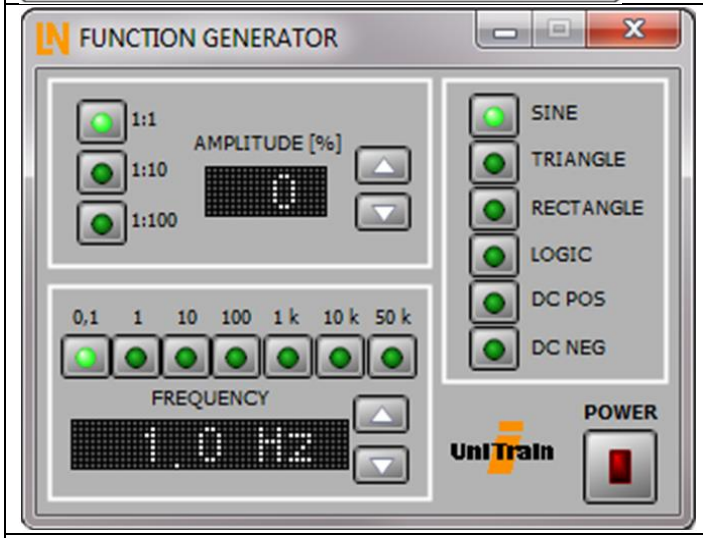


Equipment

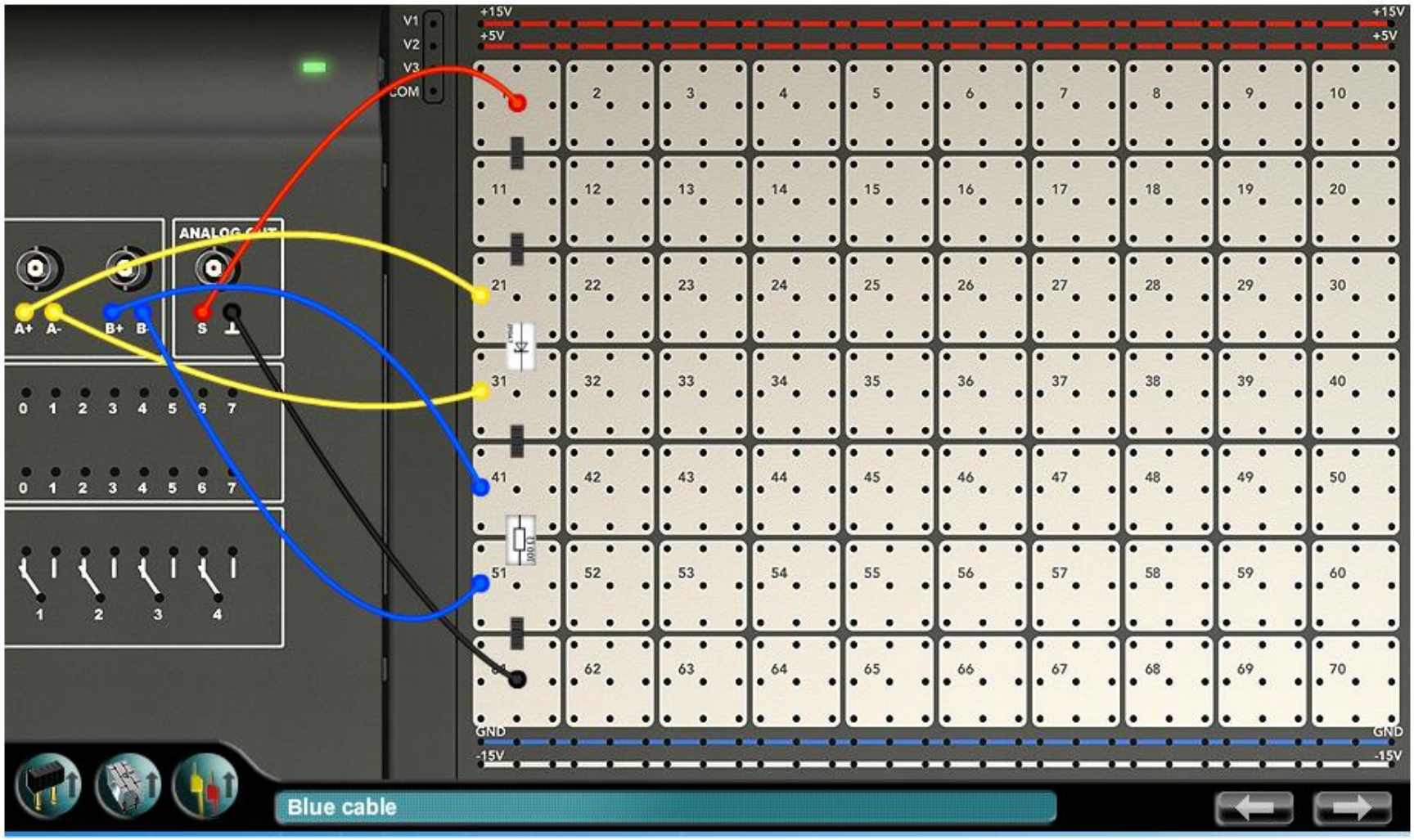
Equipment	Settings



	Channel A	Channel B
	Channel A	**Channel B**
Sensitivity	2 V/div	2 V/div
Coupling	DC	DC
Polarity	Normal	Normal
Time base	2 ms	
Mode	X/T	
Trigger channel	-	
Trigger edge	-	

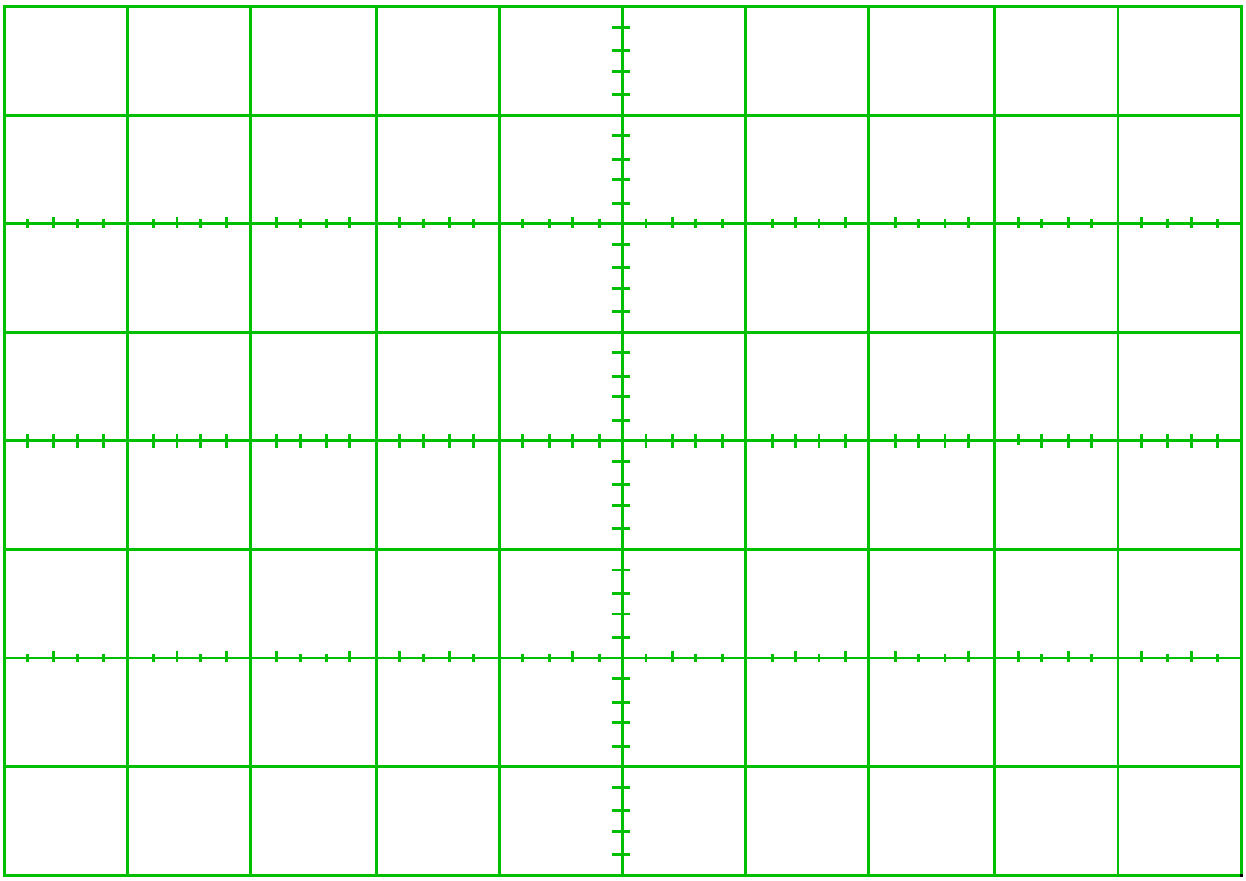


Waveform	Sine
Amplitude	16 Vpp (80%, 1:1)
Frequency factor	10
Frequency	50 Hz


V1
V2
V3
COM
+15V
+5V
-15V
GND
A+
A-
B+
B-
S
Blue cable

Experiment procedure and exercises

Configure the oscilloscope and function generator with the values given above and copy the current-voltage characteristic for a zener diode into the diagram. Make sure that you can easily read off the threshold voltage.



As of a certain voltage, its threshold voltage, the zener diode starts to conduct and the current rises almost instantaneously. In the forward-bias direction, the voltage curve corresponds to that of an ordinary diode. What is this low-voltage threshold?

V_{th} (Volts)	

What is the higher threshold exhibited when the diode is the opposite way round?

V_{th} (Volts)	