

# Polish Japanese Academy of Information Technology

Lab. 1	<b>Measurement of current and voltage</b>		Date:
name and surname		points	Supervisor

## 1. DC voltage measurement

1.1 DC voltage measurement with digital instrument - multimeter DT9208A.

	Voltage reading	Range	Absolute error $\Delta U$	Relative error $\delta$
	[V]	[V]	[V]	[%]
Power supply 5V				
Power supply 15V				

Measuring device data according to operator's manual

1.2 DC voltage measurement with analog instrument - oscilloscope

	Number of division	sensitivity	Voltage U	Range	Absolute error $\Delta U$	Relative error $\delta$
	[dz]	[V/dz]	[V]	[V]	[V]	[%]
Power supply 5V						
Power supply 15V						

Measuring device data:

- class– kl=2,
- Reading error not exceed 0.1 division

## 2. Resistance measurement

Measure resistance values of R1, R2, R3 i R4

	R measured	Range	$\Delta R$	$\delta$
	$[\Omega]$	$[\Omega]$	$[\Omega]$	[%]
R1				
R2				
R3				
R4				

### 3. DC current measurement

#### 3.1 Direct current measurement - analog device

$R = 4\ \Omega$	Current $I$	Range	Absolute error $\Delta I$	Relative error $\delta$
	[A]	[A]	[A]	[%]
Dla $U = 2V$		2A		

Measuring device data:

- class – kl=2,5
- reading error .....

#### 3.2 Indirect DC current measurement - digital device

For the voltage value from the previous point ( $U = 2V$ ), measure with the digital device the voltage  $U$  and the resistance  $R$  (the resistance is measured when the resistor disconnected)

R	$\Delta R$	U	$\Delta U$	$I_{min}$	$I_{max}$	$I$	$\Delta I$
[ $\Omega$ ]	[ $\Omega$ ]	[V]	[V]	[A]	[A]	[A]	[A]
Notes:				$I_{min} = \frac{U - \Delta U}{R + \Delta R}$	$I_{max} = \frac{U + \Delta U}{R - \Delta R}$	$I = \frac{I_{min} + I_{max}}{2}$	$I = \frac{I_{max} - I_{min}}{2}$

### 4. AC signal parameters measurement

Measure the period, frequency and peak to peak voltage with oscilloscope.

Generator frequency	Number of divisions (vertically)	Oscilloscope sensitivity	Peak to peak voltage	Number of division (horizontally)	Time base	Period T	Frequency $f = \frac{1}{T}$
[Hz]	[div]	[V/div]	[V]	[div]	[s/div]	[s]	[Hz]
1kHz					ms	ms	kHz
1MHz					$\mu s$	$\mu s$	Mhz