INTRODUCTORY PHYSICS II

PHYSICS 1020 LABORATORY MANUAL

Data Tables

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Version 10B
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Section LE-01

1 Simple Harmonic Motion

Data Table for Period and Amplitude (Procedure 2).

Initial displacement (cm)	t_1 (s)	t_2 (s)	Period (s)

Data Table for Period and Mass (Procedure 2).

Mass (g)	t_1 (s)	t_2 (s)	Period (s)

Data Table for Spring Constant (Procedure 3).

Added mass Δm (g)	Weight Δmg (N)	New position (m)	Displacement Δx (m)	Spring constant (N/m)

2 Transverse Wave Motion on a Spring

Data Table for Direct Measurement of Wave Speed (Procedure 1).

Tension (N)	Spring length (m)	Ttl. travel time (s)	# trips	Ttl. dist. traveled (m)	Wave speed (m/s)

Data Table for Wave Speed Using Standing Waves (Procedure 2).

Tension (N)	# segs.	Spring length (m)	Wavelength (m)	# vibs.	Ttl. time (s)	Freq. (Hz)	Wave speed (m/s)

Analysis Table for Direct Measurement of Wave Speed.

Tension (N)	Spring length (m)	Linear density (kg/m)	Theor. speed (m/s)	Dir. meas. speed (m/s)	% Diff.

Analysis Table for Wave Speed Comparison.

Tension (N)	Ave. s.w. speed (m/s)	Dir. meas. speed (m/s)	% Diff.

3 Standing Waves on a String

Data Table for Standing Waves on a String.

# vibrating segments	Hanging mass (g)

Analysis Table for Standing Waves on a String.

# vibrating segments	Wavelength (m)	Wave speed (m/s)	Tension (N)

4 Speed of Sound in Air

Data Table for Speed of Sound — Standing Wave Method.

Type of air column	Tube length (cm)	Resonant frequency (Hz)

Analysis Table for Speed of Sound — Standing Wave Method.

Type of tube	Resonant frequency (Hz)	Eff. length (cm)	Wavelength (m)	Speed of sound (m/s)

7 Half-Time of the RC Circuit

Data Table for Half-Time of the RC Circuit.

V_1 (V)	t_1 (s)	V_2 (V)	t_2 (s)	Half-time $t_{1/2}$ (s)

8 Measuring Electrical Resistance

Data Table for Power Resistor.

Voltage (V)	Current (A)	Calc. Resistance (Ω)	Power (W)

Data Table for Pilot Lamp.

Voltage (V)	Current (A)	Calc. Resistance (Ω)	Power (W)

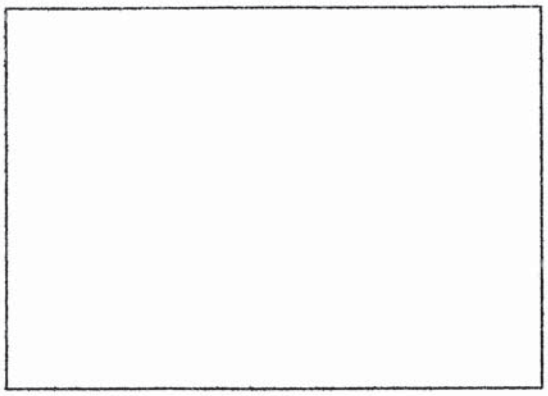
Data Table for Resistors.

Colors	Expected Resistance (Ω)	Tolerance (%)	Measured Resistance (Ω)	% Difference

9 DC Circuit Analysis

DATA SHEET

Series Circuit (circuit 1) Date _____

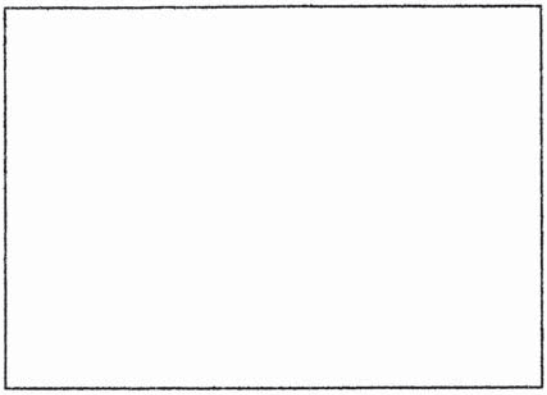


R_1 =	R_3 =
R_2 =	R_4 =

	$\mathcal{E}$, volts	I_c, amps	I_1, amps	I_2, amps	I_4, amps	V_1, volts	V_2, volts	V_4, volts
analysis	20.0							
measured	20.0							

DATA SHEET

Parallel Circuit (circuit 2) Date _____



	ϵ, volts	I_c, amps	I_3, amps	I_4, amps	V_3, volts	V_4, volts
analysis	10.0					
measured	10.0					

10 Magnetic Field due to a Cow Magnet

Data Table for Cow Magnet Data.

Distance (m)	Magnetic field (mT)

11 Magnetic Field of the Earth

Data Table for Earth's Magnetic Field.

Angle θ (deg)	Fwd. Current (A)	Rev. Current (A)

Analysis Table for Earth's Magnetic Field.

Angle θ (deg)	Fwd. Current (A)	B_C (μT)	B_E (μT)	Rev. Current (A)	B_C (μT)	B_E (μT)

12 Magnetic Force on a Current Element

Data Table for Current Element #37.

Current (A)	Balance Reading (g)	Net Force (mN)

Data Table for Current Element #38.

Current (A)	Balance Reading (g)	Net Force (mN)

14 Geometrical Optics

Data Table for Concave Mirror.

Object Position (cm)	Image Position (cm)	Image Height (cm)	Experimental Magnification (h_i / h_o)

Data Table for Converging Lens.

Object Position (cm)	Image Position (cm)	Image Height (cm)	Experimental Magnification (h_i / h_o)

15 Wave Properties of Light

Express Lab Report

WAVE PROPERTIES OF LIGHT **EXPERIMENT 15**

NAME _____ **Date** _____

Procedure 1. Diffraction. wavelength of laser _____

1.b) As the width of the single slit decreased, what change in the *width of the diffraction pattern* is observed?

comment:

2. distance L _____

slit width mm	measured width w cm	expected width w cm	percent difference

comment:

3. OMIT

Procedure 2. Double Slit Interference.

1.a) For a = 0.04 mm, d = 0.500 mm compared to a = 0.04 mm, d = 0.250 mm, what changes were observed in the positions of the interference fringes and the positions of the diffraction minima? Do your observations agree with theory?

comment:

1.b) For a = 0.04 mm, d = 0.500 mm compared to a = 0.08 mm, d = 0.500 mm, what changes were observed in the positions of the interference fringes and the positions of the diffraction minima? Do your observations agree with theory?

comment:

2. distance L _____

slit spacing mm	measured distance 2y___ cm	expected distance 2Y___ cm	percent difference

comment:

Procedure 3. Diffraction Gratings.

1. As the grating constant is increased, what change in the *fringe spacing* is observed?

comment:

2. distance L _____

grating constant lines.cm	measured distance **2y**___ cm	experimental grating constant lines/cm	percent difference
transmission grating 5276 lines/cm			

add ⟶

comment:

16 The Grating Spectrometer

Data Table for Grating Spectrometer.

Gas	Color	Meas. angle (deg)

Analysis Table for Grating Spectrometer.

Gas	Color	Meas. wavelength (nm)	Expected wavelength (nm)	% Diff.