BIRZEIT UNIVERSITY

Faculty of Science كلية العلوم

Department of Physics دائرة الفيزياء

Phys111 Report

Experiment #7: Measurement of g at BZU

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Section:	W01		
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(1) Abstract:

- **Aim of the experiment:**

To find the value of acceleration of gravity at Birzeit University.

- **The main result is:**
  - The acceleration due to gravity at BZU is $g = 10.13 \pm 0.14$ m/s^2

(2) Data:

	$S\ (cm)$	$L\ (cm)$	t_1 (sec)	t_2 (sec)	t_3 (sec)	t_{avg} (sec)	$T\ (sec)$	$T^2\ (sec^2)$
1		40 cm	12.56 sec	12.51 sec	12.49 sec	12.52 sec	1.25200 sec	1.56750 sec^2
2		50 cm	14.01 sec	13.99 sec	13.92 sec	13.9733 sec	1.39733 sec	1.95525 sec^2
3		60 cm	15.39 sec	15.27 sec	15.24 sec	15.3 sec	1.53000 sec	2.34090 sec^2
4		70 cm	16.60 sec	16.53 sec	16.68 sec	16.6033 sec	1.66033 sec	2.75671 sec^2
5		80 cm	17.81 sec	17.73 sec	17.78 sec	17.7733 sec	1.77733 sec	3.15890 sec^2
6		90 cm	18.66 sec	18.66 sec	18.73 sec	18.6833 sec	1.86833 sec	3.49067 sec^2

$\mathbf{r} = \frac{\mathbf{d}}{\mathbf{2}} =$

****NOTE: I used an angle of 7 degrees in the simulator.**

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(3)Calculations:

Use linear least square as implemented in **Excel** to calculate the slope & uncertainty of the line representing T^2 vs. L.

$\boldsymbol{slope} = 0.038979 \pm 0.000546$ sec^2/cm ➔➔ 3.8979 ± 0.0546 sec^2 / m

$\boldsymbol{g} = \frac{4\pi\text{^}2}{\text{slope (m)}} = \frac{39.4784176}{3.8979}$ = 10.12812479 m/s^2 ➔➔ 10.13 m/s^2

$\boldsymbol{\Delta g} = g \times (\frac{\Delta \text{slope}}{\text{slope}})$ = 10.13 $(\frac{0.0546}{3.8979})$ = 0.14189045 m/s^2 ➔➔ 0.14 m/s^2

(4)Results:

- The acceleration due to gravity at BZU is $\boldsymbol{g} = 10.13 \pm 0.14$ m/s^2

(5)Conclusions:

After I did the readings and calculations ,I need to make the Discrepancy Test to check if the result is accepted or not :

***Discrepancy Test = |true value – exp. Value| ≤ 2 × error**

= | 9.8 – 10.13| ≤ 2 × 0.14 ➔➔➔ 0.33 ≤ 0.28

The result is not accepted. (The true value of the gravity acceleration is 9.8 m/s^2).

The result is not acceptable, which means there are some errors.
These are some potential sources of error made the result unacceptable:

Firstly, I think that the biggest source of errors in the experiment is not accurately measuring time, so when we use the timer we should be very careful and harry to get the correct and the exact time, that leads to get less errors.

Also, if we make the experiment in real world, the external factors such as air resistance may affect the result.

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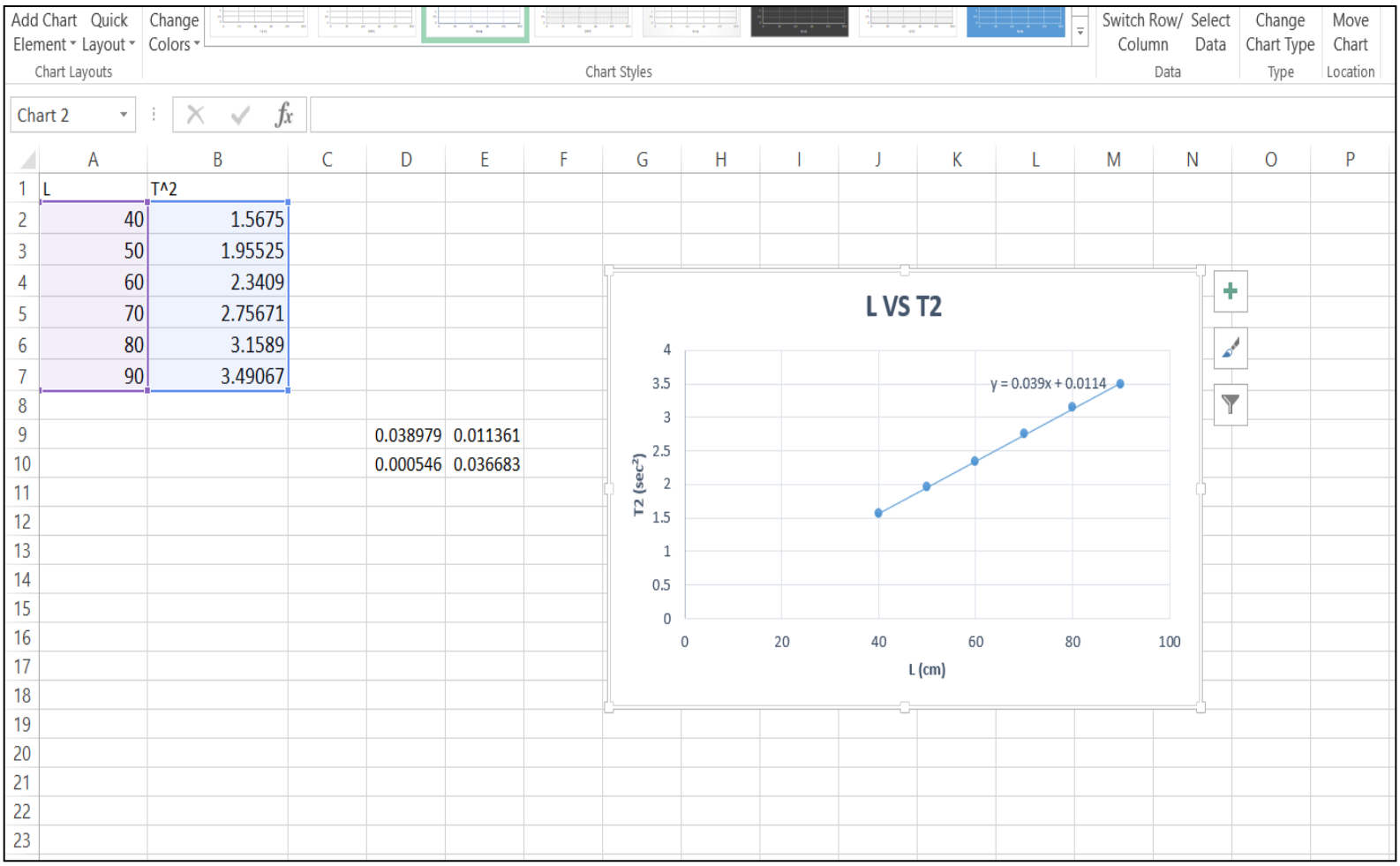

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	L	T^2														
2	40	1.5675														
3	50	1.95525														
4	60	2.3409														
5	70	2.75671														
6	80	3.1589														
7	90	3.49067														
8																
9				0.038979	0.011361											
10				0.000546	0.036683											
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