Date of Lab_____ Date of Submission_____

Laboratory Report

Title Conservation of Mechanical Energy

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11E			

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Summary

In this lab, we did two types of experiments.
First, we used pendulum.
And it proves that the potential energy of the weight at the highest point and the sum of the kinetic and potential energy of the weight is almost the same.
In the second lab, we used spring.
And it prove that the potential energy of the spring and the kinetic energy of the weight that connected the spring is almost the same.

• Meet a deadline • Write logically • Write clearly • Write with your own words

Teacher's Comments
Beautiful tables and graphs.

1	2	3	4	5	6	7	8	9
Due	Summary	Intro.	Method.	Results	Table/Fig.	Discussion	Clearness	General
+	+			+/-	+++		+	+-+

* Use this form as a cover sheet.
* Submit your reports by the seventh day after your lab.

11-E Anju Hayakawa

Physics Lab-0017

Conservation of Mechanical Energy

Introduction

Objectives:

Investigate whether the mechanical energy is conserved in the motion of (1) pendulum (2) spring

Theory:

E=K+U=constant

Mechanical Energy = Kinetic Energy + Potential Energy = Constant

Hypothesis:

(1) In the motion of the pendulum, the potential energy at the maximum height.
(2) The elastic potential energy of a spring is equal to the kinetic energy of an object attached to the spring.

Preparation

- Wooden Board
- Metal stick
- Weight

- String
- Speed Meter
- Graph Paper
- Hooke's Law Apparatus
- Spring

Experiments

#1

1. Set up the wooden board with metal stick
2. Put the graph sheet on the wooden board
3. Set the BeeSpiV at the point where the weight come its lowest point(ho)
4. Lift the weight up from the lowest point to the height(h1)
5. Release the weight pass through its lowest point
6. Read the measured value shown by BeeSpiV
7. Repeat 4-6 and change the height

#2

1. Set up the apparatus
2. Connect a spring and a weight with string
3. Let the center of weight place on zero when the spring is at natural length
4. Pull the weight and read the elongation, χ
5. Start BeeSpiV and release the weight. Read the speed.

Result

Exp.1 Mass of Weight m=32.1g=0.0321kg

	Maximum height		Minimum height					(A-B)/A x100
	h_1	A=mgh_1	h_0	v	mgh_0	½ mv^2	B= mgh_0+½ mv^2	
Exp	m	J	m	m/s	J	J	J	%
1	0.07	0.022	0.065	0.902	0.020	0.003	0.023	-4.7
2	0.10	0.032	0.065	0.919	0.020	0.014	0.034	-8.1
3	0.15	0.047	0.065	1.314	0.020	0.028	0.048	-2.1
4	0.18	0.057	0.065	1.504	0.020	0.036	0.050	-2.3
5	0.21	0.066	0.065	1.633	0.020	0.043	0.063	4.3
6	0.25	0.079	0.065	1.889	0.020	0.057	0.077	1.2
7	0.30	0.094	0.065	2.029	0.020	0.066	0.086	8.3
8	0.32	0.101	0.065	2.146	0.020	0.074	0.094	6.3

Exp.2

Spring constant k = 19.6 N/m Mass of Weight m = 0.032kg

	Spring		Weight		
	$x \times 10^{-2}$	A= $1/2\, kx^2 \times 10^{-2}$	$v \times 10^{-2}$	B= $\frac{1}{2} mv^2 \times 10^{-2}$	(A-B)/A x100
Exp	m	J	m/s	J	%
1	2.5	0.61	91.8	1.3	-1.1
2	3.5	1.2	114.4	2.1	-0.43
3	4.5	1.9	127.7	2.6	-1.3
4	5.5	3.6	144.9	3.4	0.06
5	6.5	4.1	172.8	4.8	-0.17
6	7.5	5.5	197.9	6.2	-0.13
7	8.5	7.1	248.7	9.9	-0.40
8	9.5	17.7	307.9	15.2	0.14

Discussion

In the Experiment 1, we were using the pendulum and we set up the standard point of the kinetic energy of the weight at the lowest point.
So, the highest point of the weight would be the potential energy and the lowest point of the weight would be the kinetic energy.
There were a few errors in the graph, so it could prove that the potential energy of the weight at the highest point is equal to the sum of the kinetic and potential energy of the weight at the lowest point.

In the Experiment 2, we were using the spring and weight and Grap shows that the relationship between the potential energy of the spring and he kinetic energy of the weight connect to the spring.
There were a few errors in the graph, so it could prove that the potential energy of the spring is equal to the kinetic energy of the weight connect to the spring.

Conclusion

As a conclusion, the potential energy of the weight at the highest point is equal to the sum of the kinetic and potential energy of the weight at the lowest point.
Also, the potential energy of the spring is equal to the kinetic energy of the weight connect to the spring.
According to these conclusions, we can prove Mechanical Energy (E=K+U=constant)
Mechanical Energy = Kinetic Energy + Potential Energy = Constant

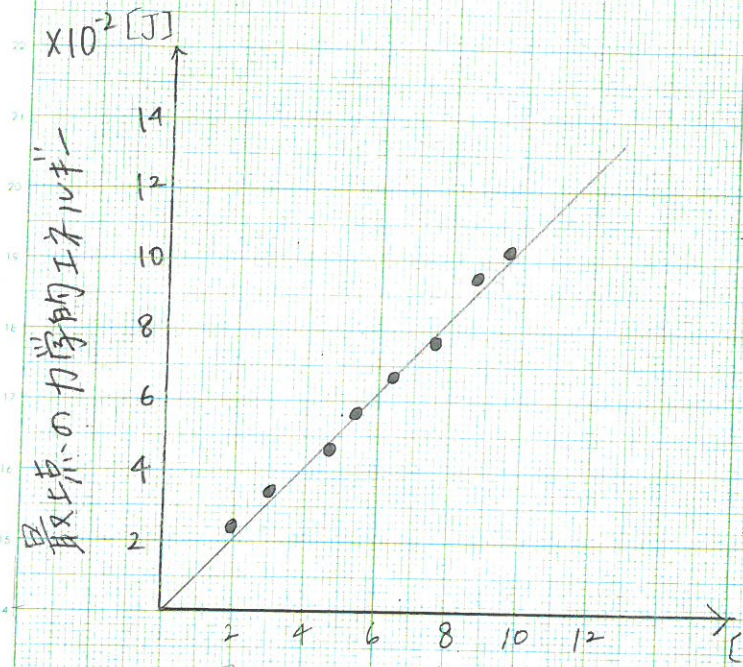
Opinion

The problems of Mechanical Energy are very difficult for me to understand, but through this experiments I could understand about the Mechanical Energy easily.

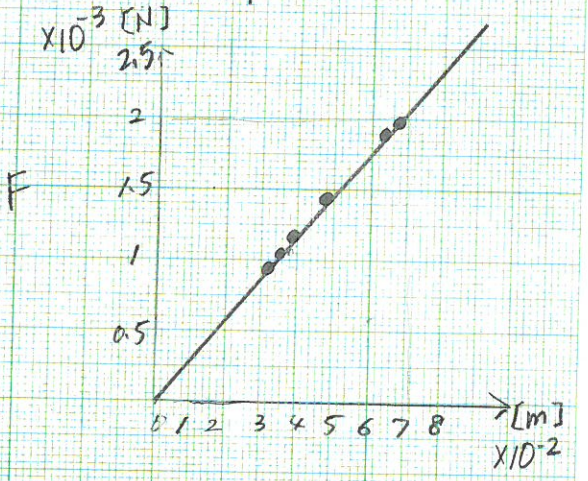
Reference

Lab Reports by Saori Shiba(2017J)

〈Graph 1〉



〈Graph 2〉



〈Graph 3〉