**PHY1002 Physics Laboratory –Informal Report**

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| Group: | 8 | Date of Experiment: | November 16th |

**Experiment 6. Conservation of Energy (Ballistic Pendulum)**

1. Fill in the table below from the pendulum experiment:

Stderr:

(1). Angle – The resolution of the rotary motion sensor is 0.00157rad, we estimate the error as ±0.5\*0.00157 rad = ±0.000785 rad

(2). H – We estimate the error as 0.5\*resolution = ±0.05mm

(3).

(4). Mass: The resolution of weight is 0.01g

|  |  |  |  |
| --- | --- | --- | --- |
| No. of Measurements | Angle (rad) | h (m) | v0 (m/s) |
| 1 | 0.0309±0.000785 | 0.0168±0.05 | 5.87±0.024 |
| 2 | 0.0283±0.000785 | 0.0141±0.05 | 5.38±0.024 |
| 3 | 0.0286±0.000785 | 0.0144±0.05 | 5.44±0.024 |
| 4 | 0.0291±0.000785 | 0.0149±0.05 | 5.53±0.024 |
| 5 | 0.0291±0.000785 | 0.0149±0.05 | 5.53±0.024 |
| Avg with SE | 0.0292±0.0002 | 0.01502±0.0001 | 5.55±0.005 |

2. Fill in the table below with v0 measured by photogate:

|  |  |
| --- | --- |
| No. of Measurements | v0 |
| 1 | 5.58±0.0015 |
| 2 | 5.57±0.0015 |
| 3 | 5.58±0.0015 |
| 4 | 5.58±0.0015 |
| 5 | 5.55±0.0015 |
| Avg with SE | 5.572±0.005 |

3. How well does the initial speed, v0, calculated from Equation 4 agree with the value measured directly using the photogates? What does this show? Why is error analysis important?

. The calculated value is about 0.394% smaller than the measured value. Basically, it shows that the measurement using pendulum is precise.

The result shows that there is extra energy loss during the experiment. Since that the period of launching the ball is approximately the same when we use pendulum and when we use photogate, we think that the energy loss caused by the vibration of the ball after it had been caught by the pendulum. Also, during the swag the friction of the pivot exists, which may also cause the loss of the energy.

The error analysis is important since the error is not ignorable in our experiment. After error analysis, we can minimize the error and operate a better experiment at next time.

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--- End of Laboratory Report ---

**Notes:**

* **Submit online with PDF or Doc version**
* **Once submitted, no further modification allowed.**
* **Due date: “D + 7”, “D” = Date of Experiment.**
* **Please don’t exceed 2 pages, with normal margin and 1.0 line space.**