**General Physics Laboratorium**

Laboratorium #2

Topic: Pendulum

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|  |  |
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| Time of classes: | Tuesday, 17:05-18:45 |
| Number of group : | Z00-33d |
| Date of submit: | 28.03.2020 |
| **Grade:** |  |

Approving the measurement results.

Date and signature of the lecturer **............................................................**

Introduction

Gravity exerts a force on every object. This force is proportional to the mass of the object.  The proportionality constant is the acceleration of gravity "g**.**"   The gravity acceleration (g) decreases with increasing elevation; however, for a few thousand feet above the Earth's surface, it remains fairly constant.  In this experiment, a **simple pendulum** will be used to measure "g".   A simple pendulumis made of a long string and a tiny metal sphere, steel or preferably lead(higher density)**.**

Steps

1. Construct simple pendulum using string and small object
2. Make measurements of its length and the time of 100 periods for 3 different lengths of string
3. Make calculations of average time uncertainties and “g”

Formulas

, where is uncertainty of instrument

Measurements #1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № | 1 | 2 | 3 | 4 | 5 | 6 |
| Length(cm) | 4.95 | 5.03 | 5.01 | 4.97 | 5 | 5.01 |
| Number of Periods | 100 | 100 | 100 | 100 | 100 | 100 |
| Time of 100 periods | 45.3 | 45 | 44.7 | 45.1 | 45.2 | 44.7 |
| Average time of 1 period | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 |

Calculations of average values:

= **4,995** cm

And uncertainties:

Measurements #2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № | 1 | 2 | 3 | 4 | 5 | 6 |
| Length(cm) | 20 | 19.9 | 20 | 20.1 | 19.8 | 19.9 |
| Number of Periods | 100 | 100 | 100 | 100 | 100 | 100 |
| Time of 100 periods | 89 | 88.6 | 88.2 | 88.7 | 88.5 | 88.4 |
| Average time of 1 period | 0.886 | 0.886 | 0.886 | 0.886 | 0.886 | 0.886 |

Average values:

= **19,95** cm

And uncertainties:

Measurements #2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| № | 1 | 2 | 3 | 4 | 5 | 6 |
| Length(cm) | 44.8 | 45.1 | 45.1 | 44.9 | 45.3 | 45 |
| Number of Periods | 100 | 100 | 100 | 100 | 100 | 100 |
| Time of 100 periods | 134.2 | 134.4 | 134.77 | 134.4 | 135 | 134.5 |
| Average time of 1 period | 1.34 | 1.34 | 1.34 | 1.34 | 1.34 | 1.34 |

Average values:

= **45,03** cm

And uncertainties:

Calculation of Gravity acceleration using the above data:

1. U(g) = 0,18

g=

1. U(g) = 0,27

g=

1. U(g) = 0,6

g=

Conclusion

The experiment shows one way to determine the acceleration due to gravity, so you can measure the approximate value of "g". All values of measurements appear real. From the results of our experiment we can conclude that although under ideal conditions the amplitude does not affect the period of oscillation, it is more convenient to use a smaller angle of displacement, as well as measure less oscillation due to friction.