

**AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)**

**FACULTY OF SCIENCE & TECHNOLOGY**

**DEPARTMENT OF PHYSICS**

**PHYSICS 1 LAB**

**Spring 2021-2022**

**Section: \_\_\_\_\_\_, Group: \_\_\_\_\_\_\_\_**

**LAB REPORT ON**

***Title of the Report***

**Supervised By**

**SUPERVISOR’S NAME**

**Submitted By**

|  |  |  |
| --- | --- | --- |
| **Name** | **ID** | **Contribution** |
| **1.** |  |  |
| **2.** |  |  |
| **3.** |  |  |
| **4.** |  |  |
| **5.** |  |  |
| **6.** |  |  |

Date of Submission: **month day, 2022**

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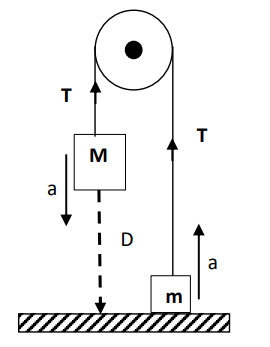
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1. **Theory**

Newton's second law of motion can be formally stated as “The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object”.So it tells that force causes acceleration and the relationship between net force acting on an object, Fnet and its acceleration, a is: Fnet = ma, where m is the mass of that object.

In Atwood machine, two masses m and M are suspended by a piece of inelastic light string that passes over a pulley in a vertical plane as the fig. 2.1 shows. The two masses are connected with a string, because of this, they must have same tension, T and acceleration,a.

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If we consider the upward direction as positive, neglecting friction and mass of the pulley and applying Newton’s second law of motion we get

For M : Fnet = T – Mg = -Ma

For m : Fnet  = T – mg = mg

If we solve these two equations,we get the theoretical acceleration as,

ath = (M-m)

As acceleration due to gravity g is constant in a particular place and taking total mass (M+m) constant for the Atwood machine, according to Newton’s second law we get**,**

Figure 1:Arrangement of an ath  (M – m)

Atwood machine.Here M>m

According to figure 1, the mass M falls a distance D in time t from rest. Applying the knowledge of equations of motion (D = ut +1/2 at2 ), we can calculate the experimental acceleration by,

aex =

For different mass combination, (M-m) we will get different experimental accelerations, aex. If we find a linear relationship between aex and (M-m) for the Atwood machine, we can say that Newton’s second law is verified.

1. **Apparatus**

1.Pulley

    2.Two hangers

    3.Different masses

    4.String

    5.Stand and clamp

    6.Meter scale 

    7.Stop watch

1. **Procedure**
2. **Experimental Data**

Table :Acceleration for different mass combination

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| M  (gm) | m  (gm) | Height  D  (cm) | Time  t  (s) | Mean time  t  (s) | aexp =  (cm.s-2) | ath =  (cm.s-2) | (M-m)  (gm) |
| 500 | 200 | 79.5 | 0.56 | 0.55 | 525.619 | 420 | 300 |
| 0.55 |
| 0.54 |
| 475 | 225 | 79.5 | 0.62 | 0.637 | 392.217 | 350 | 250 |
| 0.65 |
| 0.64 |
| 450 | 250 | 79.5 | 0.76 | 0.75 | 282.666 | 280 | 200 |
| 0.74 |
| 0.75 |
| 425 | 275 | 79.5 | 0.80 | 0.8067 | 244.3278 | 210 | 150 |
| 0.83 |
| 0.79 |
| 400 | 300 | 79.5 | 0.90 | 0.9233 | 186.514 | 140 | 100 |
| 0.94 |
| 0.93 |
| 375 | 325 | 79.5 | 1.09 | 1.106 | 129.983 | 70 | 50 |
| 1.10 |
| 1.13 |
| 350 | 350 | - | 0 |  | 0 | 0 | 0 |

**5.Analysis and Calculation**

**i)The slope of the straight line:**

From the graph-

Slope=

Or, M+m=700gm

**(ii)Error of (M+m)** = =0%

1. **Result**

*(A brief result of the experiment should be written here)*

1. **Discussion**

*(Students may discuss, in passive form, the objectives, precautions, challenges, errors in results, etc. related with the experiment)*

1. **References**

*(Students must include all the sources they have used in the report)*

1. **Appendices** (if any)

(*The following part is only to be followed in preparing the report*)

**Instructions**

* The **font** is ‘**Times new Roman**’.
* The **font size** of all the **titles** are **16 down to 12**, 16 being the main title, 14 **subtitle**, and so on.
* The **font size** of all the **text** must be **11** andall text should be **justified**.
* From the **Paragraph**🡪**Indents & Spacing tab**.
  + **Line spacing**🡪**1.5 lines**.
  + **Spacing🡪Before** and **After** both will be **6 pt**.
  + Check **√**the box ‘**Don’t add space between paragraphs of the same style**’.
* All the gaps between the paragraphs, titles, etc. should be same.