

**PHYSICS LAB REPORT**

**(EXPERIMENT # 8c)**

**SUBMITTED TO: MAM FARZANA JAFER**

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**ROLL NO: 233038**

**SECTION: BSCS-EV-1C**

**Objective:**

Force versus Magnetic Field.

**Theory:**

Like the last two experiments, we will use the same equipment this time to measure the relationship between the Force and Magnetic Field. For this part, we will change the number of magnets 6 times and measure the mass once by providing the current and then by not providing the current. After doing so, we will measure Force by subtracting both values of the masses.

We will use the current as 2A, and the current loop would be SF 38 with a length of 4.2cm.

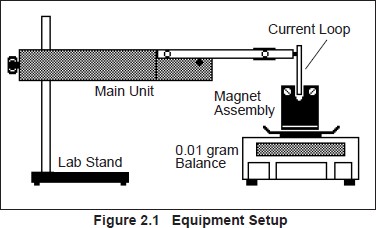
We know that,

**= ILB**

Or in scalar terms,

=**ILB sin θ**

The arrangement is given in the following setup:



**Apparatus:**

* Digital balance.
* Magnetic Assembly.
* Power Supply.
* Lab stands.
* Connecting wires.
* Wire segments.

**Procedure:**

1. Set up the apparatus as shown in the figure 2.1.
2. Use a single magnet, centered under the center of the holder.
3. Place the magnet assembly on the pan of the balance. With no current flowing, press the TARE button, bringing the reading to 0.00 grams.
4. Now turn the current on, and adjust it to 2.0 amps. Record the mass value in the “Force column” of the table.
5. Add additional magnets, one at a time. (Make sure the north poles of the magnet are all on the same side of Magnet Assembly.)
6. Each time you add a magnet, repeat steps 3-5.

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of magnets** | **I = 0**  **(gram)** | **I 0**  **(gram)** | **“Force” gram** |
| 1 | 103.5 | 103.6 | 0.1 |
| 2 | 116.61 | 116.81 | 0.2 |
| 3 | 129.68 | 129.98 | 0.3 |
| 4 | 142.08 | 142.48 | 0.4 |
| 5 | 155.05 | 155.55 | 0.5 |
| 6 | 167.97 | 167.57 | 0.6 |

**Analysis:**

1. ***What is the relationship between these two variables?***

The relationship is directly proportional between Force and Magnetic Field.

1. ***How does the number of magnets affect the force between the current-carrying wire and the magnetic field?***

The number of magnets can influence the magnetic field strength, which can affect the force as well. If the magnetic field strength is increased, the force is likely to increase as well. Similarly, if the magnetic field strength decreases, the force is also likely to decrease.

1. ***Is it reasonable to assume that the strength of the magnetic field is directly proportional to the number of magnets?***

Yes, it is reasonable to assume that the strength of the magnetic field is directly proportional to the number of magnets under certain conditions. If the relationship between the number of magnets and the magnetic field strength is linear, then it is directly proportional. However, if the relationship is nonlinear, considerations may be necessary.

1. ***What would happen if one of the magnets were put into the assembly backward, with its north pole next to the other magnets’ south pole?***

If we place one or more magnets backward, for example, if we place 3 magnets backward, the mass would be the same for both conditions in the table, and after subtracting, the force would be zero.

**Precautions:**

1. Do not provide high voltage otherwise there is a risk of electrical shocks.
2. Always measure the force with current once and then without current.
3. Make sure that the current loop does not touch the magnet.
4. Change the number of magnets after measuring the current for one.

**Graph:**

The graph is plotted between the FORCE along vertical y-axis and NUMBER OF THE MAGNETS along the horizontal x-axis. The line obtained on the graph is a straight line.

**RESULT:**

The relation between the Force and the Magnetic Field is Linear relation. Do the line obtained on the graph is a straight line.