1. Suggest and justify, by using equations, a method allowing to obtain $m \times l$. (2.0 points)

2. Experimentally determine the value of $m \times l$. (2.0 points)

$m \times l = \underline{\phantom{00000000000000000}}$
PART-B

1. Measure $v$ for various values of $h$. Plot the data on a graph paper in a form that is suitable to find the value of $m$. Identify the slow rotation region and the fast rotation region on the graph. (4.0 points)

   (On a separate graph paper)

2. Show from your measurements that $h = Cv^2$ in the slow rotation region, and $h = Av^2 + B$ in the fast rotation region. (1.0 points)

   (In the plot above)

3. Relate the coefficient $C$ to the parameters of the MBB. (1.0 points)
4. Relate the coefficients $A$ and $B$ to the parameters of the MBB. (1.0 points)
5. Determine the value of $m$ from your measurements and the results obtained in \textit{PART-A}. (3.0 points) 

\[ m = \text{____________________________} \]
PART-C

1. Measure the periods $T_1$ and $T_2$ of small oscillation shown in Figs. 3 (1) and (2) and write down their values, respectively. (1.0 points)

\[ T_1 = \text{__________________________} . \]

\[ T_2 = \text{__________________________} . \]

2. Explain, by using equations, why the angular frequencies $\omega_1$ and $\omega_2$ of small oscillation of the configurations are different. (1.0 points)
3. Evaluate $\Delta l$ by eliminating $I_o$ from the previous results. (1.0 points)

$$\Delta l = \text{______________________________}.$$
4. Write down the value of the effective total spring constant $k$ of the two-spring system. (2.0 points)

\[ k = \quad \] .

5. Obtain the respective values of $k_1$ and $k_2$. Write down their values. (1.0 points)

\[ k_1 = \quad \] .

\[ k_2 = \quad \] .