SAKARYA UNIVERSITY
FACULTY OF
ENGINEERING/SCIENCE
2025-2026 FALL SEMESTER
PHYSICS-I LABORATORY
EXPERIMENT REPORT

Department: **Name Surname – Signature:**

Group Number:

EXPERIMENT NO4

EXPERIMENT TITLE : COLLISIONS AND CONSERVATION OF LINEAR MOMENTUM

OBJECTIVE OF THE EXPERIMENT *(5 points)*:

THEORY OF THE EXPERIMENT ***(5 points)*** **:**

1. Provide information about **elastic collisions**, **inelastic collisions**, and **perfectly inelastic collisions** and briefly explain their differences.

2. Under what conditions is **momentum** conserved? Explain with an example.

EXPERIMENTAL SETUP:

1. **Draw the setup used in the experiment.** ***(3 points)***

2. **Write the names of the materials used in the experiment and briefly explain them.** ***(3 points)***

PROCEDURE OF THE EXPERIMENT:

Explain the steps of the experiment procedure completely and sequentially. ***(5 points)***

MEASUREMENTS AND CALCULATIONS

Elastic Collision

1. State the frequency you used. ***(4 poins)***

Frequency (f).....s^{-1}

2. Mark the path followed by each disk (it doen not have to start from the initial point) as $\vec{A}$ ve $\vec{B}$, before the collision and as $\vec{A}'$ ve $\vec{B}'$ after the collision. Using two or three points along these paths, determine the velocities. ***(5 points)***

$\vec{v}_A$:..... ..... $\vec{v}_B$:..... ..... $\vec{v}'_A$:..... ..... $\vec{v}'_B$:..... .....

3. Determine the vector sums $\vec{v}_A + \vec{v}_B$ ve $\vec{v}'_A + \vec{v}'_B$ and demonstrate whether momentum is conserved. State theoretically what you expect to observe. (The diagrams will be presented on milimeter graph paper.) ***(15 points)***

4. Find the common velocities of the centers of mass before and after the collision, and state whether these velocities are conserved. State whether the result you expected theoretically matches the result you found. ***(5 points)***

5. State whether the total kinetic energy is conserved before and after the collision. State whether the result you expected theoretically matches the result you found. ***(10 points)***

Inelastic Collision

6. Remove your data sheet examine the trac marks formed. Mark the path followed by each disk (it does not have to start from the initial point) as $\vec{A}$ ve $\vec{B}$, before the collision $\overrightarrow{AB}$ after the collision. Using two or three points along these paths, determine the velocities. ***(5 points)***

$\vec{V}_A$:…… …….. $\vec{V}_B$:……. ……. $\vec{V}_{AB}$:……... …….

7. Determine the vector sums $\vec{V}_A + \vec{V}_B$ and compare it with the velocity $\vec{V}_{AB}$ to Show whether momentum is conserved. State theoretically what you expect to observe. (The diagrams will be presented on milimeter graph paper.) ***(15 points)***

8. Indicate whether the total kinetic energy before and after the collision is conserved. State theoretically what you expect, and explain whether the result you obtain is consistent with your theoretical expectation. ***(10 points)***

9. Compare the results you obtained in the experiment and provide your interpretation. ***(10 points)***