ACTIVITY NO. 4
COEFFICIENT OF RESTITUTION

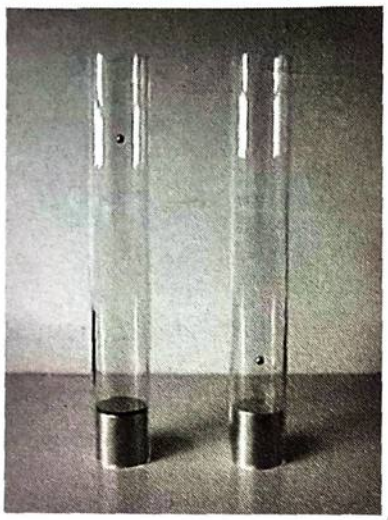
Aim : To determine the coefficient of restitution.

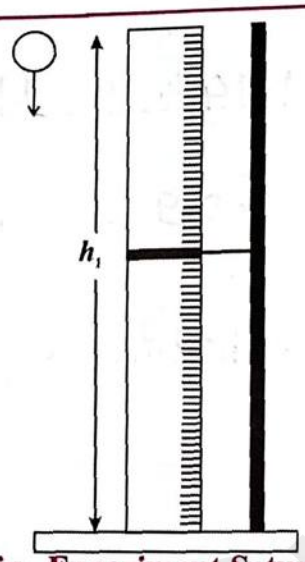
Apparatus : Rubber balls of different sizes (preferably same material), wooden board, meter scale, retort stand.

Formula:

$$e = \sqrt{\frac{h_2}{h_1}}$$

Diagram :





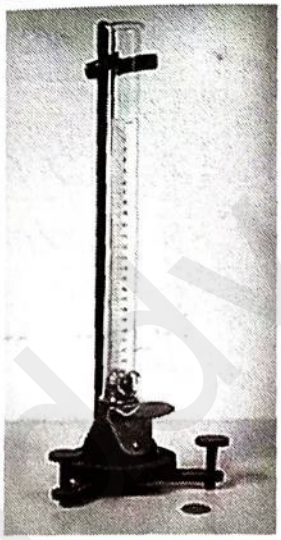


Fig . Experiment Setup

Procedure :

1. Measure the mass of each rubber ball.
2. Arrange the set up as shown in the figure.
3. Leave a ball vertically downward from the fixed height (may be 1 m).
4. Measure and record the height reached by the ball after the first bounce from the rigid floor of the laboratory.
5. Repeat the same for each ball one at a time and record the height reached.
6. Now the same experiment needs to be repeated with floor changed to wooden board.

Observations :

1. Mass of Ball (M_1) = ... 3·7 ..... g.
2. Mass of Ball (M_2) = ... 15·2 ..... g.
3. Mass of Ball (M_3) = ... 17·2 gm ..... g.

Height of the ball initially = h_1 = ---- 100 ---- cm.

Observation table :

Ball	Height of bounce of ball from Rigid Floor Surface (h_2)	Height of bounce of ball from Wooden Board surface (h_2)
1	4·5	38
2	34·5	40
3	37	39

Calculations:

1. Calculation of coefficient of restitution (for rigid floor surface).

Ball Number	$e = \sqrt{\frac{h_2}{h_1}}$
1	0.6708
2	0.5831
3	0.6083

2. Calculation of coefficient of restitution (for wooden floor surface).

Ball Number	$e = \sqrt{\frac{h_2}{h_1}}$
1	0.6164
2	0.6325
3	0.6045

Conclusion:

Compare the value of 'e' for different ball for same surface and draw your conclusion.

① coefficent of surface is depended as surface lied independent of mass.

Precautions : Use thread and scale method to measure vertical height.

FOR NOTES

The coffiicient of sufficient is imporant because it is what determine whether a callusion is elastic as in elastic in realise. Determing whether a callision form of loss of kinetic energy as a result of thus callision.

Remark and sign of teacher: .....