Worksheet

Experiment: Determining the Coefficient of Static Friction - 2 (Inclined Plane)

Aim: To measure the critical angle of inclination for a given surface and to calculate it's coefficient of static friction using inclined plane and block system.

Observation:

Obs No.	Surface	Weight of body A, W_A (dynes)	*Critical Angle of Inclination, Θ_c (º)	Coefficient of Static Friction, $\mu_S = \tan(\Theta_c)$

* **Θ_c –** angle of inclination of the surface at which the body resting on it just starts to slide

Calculations:
μ_S = coefficient of static friction

Θ = Angle of inclination (º)

Normal Force, $N = W_A \times \cos\Theta$ (dynes)

Frictional Force, $F_f = \mu_S.N$ (dynes)

Sliding Force, $F_S = W_A \times \sin\Theta$ (dynes)

Critical Angle of inclination, Θ_c = This is the angle of inclination at which the Frictional force and the Sliding force are equal to each other. When the inclination increases even slightly beyond the critical angle, the body will start sliding down the surface.

At the critical angle Θ_c,
Frictional force = Sliding force
$\mu_S \times N = W_A \times \sin\Theta_c$

But, $N = W_A \times \cos\Theta_c$

Therefore,
$\mu_S \times W_A \times \cos\Theta_c = W_A \times \sin\Theta_c$

$\mu_S = \tan\Theta_c$

Conclusion:

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