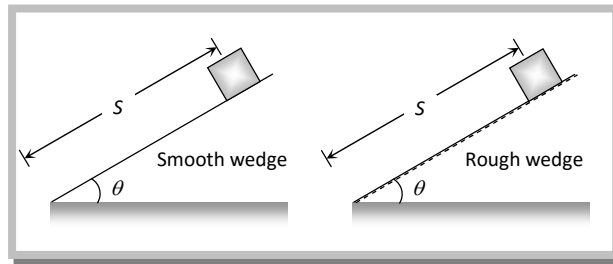


Coefficient of Friction between Body and Wedge.

A body slides on a smooth wedge of angle θ and its time of descent is t .



If the same wedge made rough then time taken by it to come down becomes n times more (i.e. nt)

The length of path in both the cases are same.

For smooth wedge

$$S = ut + \frac{1}{2}at^2$$

$$S = \frac{1}{2}(g \sin \theta)t^2 \quad \dots(i)$$

$$[Asu = 0 \text{ and } a = g \sin \theta]$$

For rough wedge

$$S = ut + \frac{1}{2}at^2$$

$$S = \frac{1}{2}g(\sin \theta - \mu \cos \theta)(nt)^2 \quad \dots(ii)$$

$$[Asu = 0 \text{ and } a = g(\sin \theta - \mu \cos \theta)]$$

From equation (i) and (ii) $\frac{1}{2}(g \sin \theta)t^2 = \frac{1}{2}g(\sin \theta - \mu \cos \theta)(nt)^2$

$$\Rightarrow \sin \theta = (\sin \theta - \mu \cos \theta)n^2$$

$$\Rightarrow \mu = \tan \theta \left[1 - \frac{1}{n^2} \right]$$