Answer on Question #76053, Physics Classical Mechanics
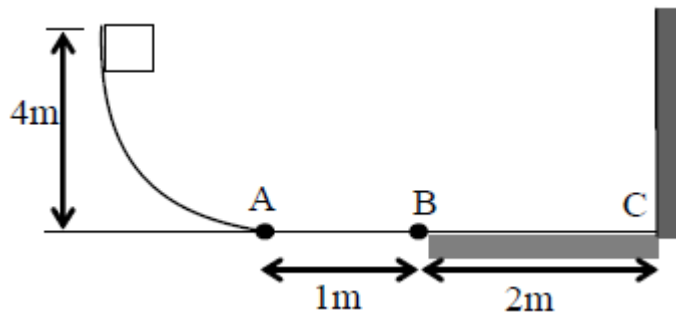
A block of mass m=0.1kg is released from a height of 4m on a curved smooth surface, path AB(1m) is smooth and path BC(2m) offers coefficient of friction 0.1. If the impact of block with vertical wall at C be perfectly elastic, the total distance covered by the block on the horizontal surface before coming to rest will be_____…[g=10m/s^2]

Ans:59m

Solution

$$mgh = \mu mgd$$

$$d = \frac{h}{\mu} = \frac{4}{0.1} = 40 \ m.$$

It is the total path on the rough surface.

$$n = \frac{40}{2} = 20$$

So, it travels through BC 20 times. But the last time it cannot move from B to A. Thus, it travels through AB 20-1=19 times.

The total distance covered by the block on the horizontal surface before coming to rest will be

$$S = 20(2) + 19(1) = 59 \ m.$$

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