## Answer on Question #50068, Physics, Mechanics | Kinematics | Dynamics

A ball of mass m is released from the top of an inclined plane of angle ø. Its strikes a rigid wall at a distance 3I/4 from top elastically. The impulse imparted to ball by rigid wall is

(1) m√3/2gh
(2)m√3gh
(3)2m√3gh
(4)m√6gh
(I= length of hypotenuse of plank)
(h = height of inclined plane)

## Solution:

The impulse of force can be extracted and found to be equal to the change in momentum of an object provided the mass is constant:

Impulse = 
$$m\Delta v$$

The change in momentum is

$$\Delta v = v_2 - v_1$$

When the strike is elastically

$$v_1 = -v_2 = -v$$

The total mechanical energy in any isolated system of objects remains constant if the objects interact only through conservative forces:

$$\frac{1}{2}mv^2 = mgh_1$$

Thus,

Where

 $v = \sqrt{2gh_1}$ 

$$\frac{h_1}{h} = \frac{\frac{3}{4}l}{l}$$

Hence

$$h_1 = \frac{3}{4}h$$

Impulse is

$$= 2mv = 2m\sqrt{\frac{2g3}{4}h} = m\sqrt{\frac{4*3*gh}{2}} = m\sqrt{6gh}$$

Answer: (4)m√6gh

http://www.AssignmentExpert.com/