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

A ball of mass $m$ is released from the top of an inclined plane of angle $\varnothing$. Its strikes a rigid wall at a distance $31 / 4$ from top elastically. The impulse imparted to ball by rigid wall is
(1) $\mathrm{mv} 3 / 2 \mathrm{gh}$
(2)mv3gh
(3) 2 mV 3 gh
(4)mv6gh
(l= 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:

$$
\text { Impulse }=m \Delta v
$$

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:

$$
\frac{1}{2} m v^{2}=m g h_{1}
$$

Thus,

$$
v=\sqrt{2 g h_{1}}
$$

Where

$$
\frac{h_{1}}{h}=\frac{\frac{3}{4} l}{l}
$$

Hence

$$
h_{1}=\frac{3}{4} h
$$

Impulse is

$$
=2 m v=2 m \sqrt{\frac{2 g 3}{4} h}=m \sqrt{\frac{4 * 3 * g h}{2}}=m \sqrt{6 g h}
$$

Answer: (4)mv6gh

