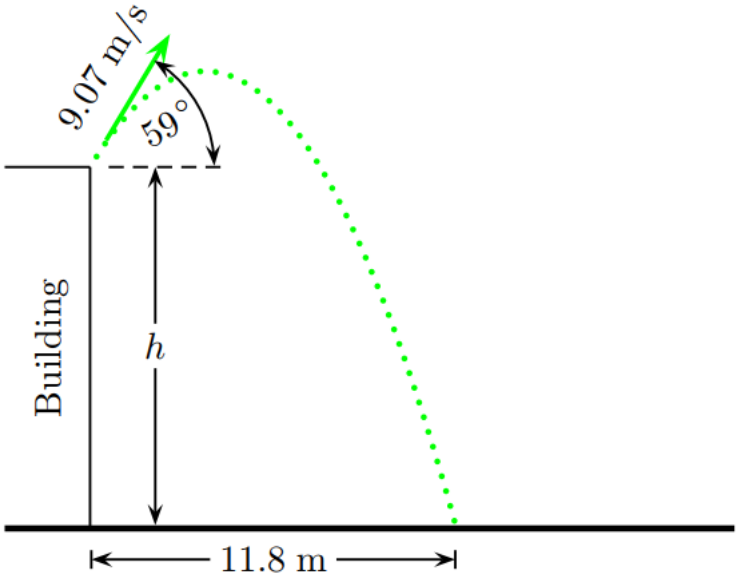
Question: A 0.87 kg rock is projected from the edge of the top of a buildi...



A 0.87 kg rock is projected from the edge of the top of a building with an initial velocity of 9.07 m/s at an angle 59◦ above the horizontal. Due to gravity, the rock strikes the ground at a horizontal distance of 11.8 m from the base of the building. Assume: The ground is level and that the side of the building is vertical. The acceleration of gravity is 9.8 m/s 2 . How tall, h, is the building? Answer in units of m.

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Expert Answer

Anonymous answered this
10,762 answers

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using Kinematic equations

S = (Voy*t) + (0.5*ay*t^2)

S = -h = - height of the building

Voy is the y-component of initial velocity = 9.07*sin(59) = 7.77 m/sec

ay is the vertical component of accelaration

-h = (7.77*t)-(0.5*9.8*t^2)

t is the time for which the body is in air

along X-axis , there is no forces acting hence ax = 0

horizontal range is X = Vox*t

11.8 = (9.07*cos(59))*t

t = 2.52 sec

then
-h = (7.77*t)-(0.5*9.8*t^2)
-h = (7.77*2.52)-(0.5*9.8*2.52^2)

h = 11.53 m

Practice with similar questions

Q: A 0.8 kg rock is projected from the edge of the top of a building with an initial velocity of 8.99 m/s at an angle 51○ above the horizontal. Due to gravity, the rock strikes the ground at a horizontal distance of 13.6 m from the base of the building. Assume: The ground is level and that the side of the building is vertical. The acceleration of gravity is 9.8 m/s 2 . How tall, h, is...

A: See answer

Q: A 0.57 kg rock is projected from the edge of the top of a building with an initial velocity of 7.97 m/s at an angle 51 degree above the horizontal. Due to gravity, the rock strikes the ground at a horizontal distance of 12.2 m from the base of the building. Assume: The ground is level and that the side of the building is vertical. The acceleration of gravity is 9.8 m/s2 increased to...

A: See answer

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Q: A 0.6 kg rock is projected from the edge of the top of a building with an initial velocity of 8.09 m/s at an angle 52° above the horizontal. The building is 9.82 m in height. 8.09 m/s o 52 Building 9.82 m x At what horizontal distance, x, from the base of the building will the rock strike the ground? Assume the ground is level and that the side of the building is vertical. The...

A: See answer 100% (2 ratings)

Q: A freight train has a mass of 1.6 107 kg. If the locomotive can exert a constant pull of 7.9 105 N, how long does it take to increase the speed of the train from rest to 90 km/h? min

A: See answer 100% (14 ratings)

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