

Physics 101- Chapter 7

Quiz No. 4

Name: key

ID:

Sec: 28

A 1.5 Kg block is initially at rest on a horizontal frictionless surface when a horizontal force in the positive direction of an X axis is applied to the block. The force is given by $\vec{F}(x) = (25 - x^2) \vec{i}$ N, where x is in meter and initial position of the block is $x = 0$.

1- What is the kinetic energy of the block as it passes through $x = 2$ m?

Using the work-kinetic energy theorem:

$$\Delta K = W \Rightarrow K_f - K_i = \int_a^b F(x) dx$$

$$K_f = K_i + \int_0^2 (25 - x^2) dx = \left(25x - \frac{1}{3}x^3 \right) \Big|_0^2 = 47.3 \text{ J}$$