TPHYS 121 Workshop Week 8

Module 4 Problems

Exercise 1

For each of the following let $g = 10m/s^2$ unless otherwise stated.

A $3kg$ box is pushed along a frictionless horizontal surface by a constant force of $12N$. The force is applied in the direction of motion over a distance of 5 meters.(assume it starts at rest)

a How much work is done on the box?

b What is the velocity of the box after moving 5 meters?

Exercise 2

A $4kg$ object is initially moving at $6m/s$ on a rough horizontal surface. A $15N$ force is applied in the direction of motion over a distance of 4 meters. The coefficient of kinetic friction between the object and the ground is 0.125

a Calculate the total work done on the object.

b Determine the object's final velocity.

Exercise 3

A $6kg$ block slides on a frictionless surface at $4m/s$. It collides and sticks to a $4kg$ block that was intitially at rest.

1. Find the velocity of both blocks after the collision.
2. Is energy conserved? Why or why not?

Exercise 4

A $5kg$ box is pushed up a frictionless ramp inclined at $30^{\cdot}$ with a constant force of $40N$ applied parallel to the ramp. The box starts from rest and moves 3 meters along the ramp.

1. How much work is done by the applied force?
2. How much work is done by the force of gravity?
3. What is the velocity of the box after moving 3 meters?

Additional Resources

- Flipping Physics on youtube: `https://www.youtube.com/user/flippingphysics`