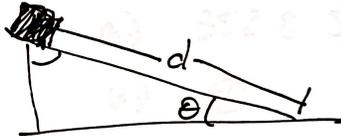


11/11 In Class – Review and Practice Problems for Exam 2

The major topics are all here, but every specific example is not. I consider the major topics to be: work, conservation of energy, momentum, conservation of momentum, torque, rotational kinematics, and rotational dynamics.

1. An object of mass $m = 12\text{kg}$ starts from rest and slides a distance $d = 5\text{m}$ down a frictionless incline. The incline makes an angle of $\theta = 36.87^\circ$ with respect to the horizontal.
 - (a) How much work does gravity do on the object?
 - (b) How much work does the normal force do on the object?
 - (c) What is the objects speed at the end of its motion?



2. An object of mass $m = 12\text{kg}$ starts from rest and slides a distance $d = 5\text{m}$ down a rough incline. The incline makes an angle of $\theta = 36.87^\circ$ with respect to the horizontal. The coefficient of kinetic friction between the object and the incline is 0.2.
 - (a) How much work does gravity do on the object?
 - (b) How much work does the normal force do on the object?
 - (c) How much work does the friction force do on the object?
 - (d) What is the objects speed at the end of its motion?
3. A solid sphere of radius $R = 10\text{cm}$ and mass $m = 1.5\text{kg}$ rolls down an incline. It starts from vertical height $h = 70\text{cm}$ above ground level. What is the sphere's speed just before it hits the level ground?
4. Two carts are at rest on a level, frictionless track. They are connected by a spring of constant $k = 2000\text{N/m}$ that is compressed 5cm. The spring releases and the two carts move away from each other. The cart on the left has mass $m = 500\text{g}$, and the cart on the right has mass $2m$, what is the speed of the cart on the right? (You can assume the spring is massless.)

5. A meterstick is balanced on a fulcrum placed at its center (50cm mark). A 200g mass hangs at the 10cm mark. Where would I place a 500g mass to balance the meterstick?
6. A DVD spins up from rest to an angular speed of 1500 rpm in 0.75s.
 - (a) What is the angular speed in rad/s?
 - (b) What is its angular acceleration?
 - (c) How many revolutions does it make in that time?
 - (d) What net torque would be required if the disk has a radius of 10cm and a mass of 25g?