MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Department of Physics

Physics 8.01 TEAL **Fall Term 2004**

In-Class Problems 22-23: Mechanical Energy

Section_____Table and Group Number _____

Names _____

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Hand in one solution per group.

We would like each group to apply the problem solving strategy with the four stages (see below) to answer the following two problems.

I. Understand – get a conceptual grasp of the problem
II. Devise a Plan - set up a procedure to obtain the desired solution
III. Carry our your plan – solve the problem!
IV. Look Back – check your solution and method of solution

Problem 22: *Escape Velocity and Mechanical Energy*

The asteroid Toro, discovered in 1964, has a radius of about $R = 5.0\,km$ and a mass of about $m_t = 2.0\times10^{15}$ kg. Let's assume that Toro is a perfectly uniform sphere. What is the escape velocity for an object of mass m on the surface of Toro? Could a person reach this speed (on Earth) by running?

Problem 23: Circular Motion and Conservation of Mechanical Energy

An object of mass m is released from rest at a height h above the surface of a table. The object slides along the inside of the loop-the-loop track consisting of a ramp and a circular loop of radius R shown in the figure. Assume that the track is frictionless. When the object is at the top of the track it pushes against the track with a force equal to three times it's weight. What height was the object dropped from?