

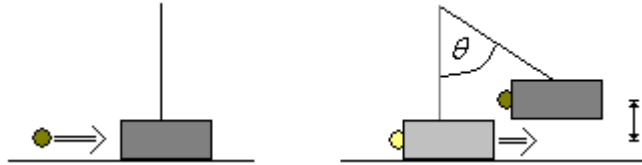


**HONORS PHYSICS**  
**T07H: Take Home**

created: 2010 0301

revised: 2010 0303

NAME:		Score (Do not write here)	
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A small rocket is attached to a clay blob of mass 0.270 kg. The rocket is rated with a power of 1.4 W. It applies a constant horizontal thrust for 20 s while the blob slides across a frictionless floor for a distance of 1.7 m; then the rocket shuts off. The blob slides an additional 0.2 m before colliding to and sticking to a box of mass 3.6 kg. The box is suspended from the ceiling by an ideal rope of length 2.4 m. The combined blob+box swing up through a certain angle  $\theta$  and then back down again.

- How much work is done by the rocket? If you do not find an answer, use 25 J for the rest of the problem.
  - What was the thrust exerted by the rocket? If you do not find an answer, use 16.7 N for the rest of the problem.
  - How fast was the blob going just before it hit the box? If you do not find an answer, use 13.1 m/s for the rest of the problem.
  - How fast was the combined blob+box moving just after the collision? If you do not find an answer, use 3.7 m/s for the rest of the problem.
  - What is the maximum angle made by the rope, as measured from the vertical?
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NAME: