The University of Alabama at Birmingham (UAB)
Department of Physics

PH 462/562 – Classical Mechanics II – Spring 2006

Assignment # 3 Due: **Tuesday, Jan. 24**
(Turn in for credit!)

1. Textbook Problems: **3.1, 3.2, 3.3, 3.6, 3.7, 3.15, 3.16, 3.17, 3.20,**

2. A hoe of mass m_1 attached to a rod of length l of negligible mass is released from an initial angle θ_0 and scoops up a bunch of sand of mass m_2, as shown in the figure. Assume that the pivoting point of support of the system is frictionless and that gravity is the only force acting on the system.

    a. From the point of view of the conservation laws (e.g., conservation of momentum, conservation of energy, etc.), divide the problem in a suitable number of parts and state which conservation laws may be applied to each part.

    b. Find the maximum angle θ_f that the hoe reaches after scooping up the sand.

    Note: *In order to keep this problem tractable, you may have to make several assumptions and approximations that are not necessarily obvious. State the assumptions and approximations you make.*