1. Two masses are released at the same height, and fall a very long distance under gravity, till they hit the ground. The masses are subject to air friction, which you should **assume** has the form $-b\vec{v}$ for both masses, even if this mathematical form is not very accurate. Mass A is made of lead. Mass B is made of a much less dense plastic. Both masses have the same size and shape, and therefore have the **same** friction coefficient b. Which one reaches the ground first?
(A) They both reach the ground at the same time.
(B) Mass B reaches the ground first.
(C) Mass A reaches the ground first.

2. A mass is thrown upwards on the earth, with an initial velocity v_o. It reaches some maximum height h_e. (Ignore air friction.) The experiment is repeated on the Moon with the same mass and the same v_0, and the mass reaches a different height h_m, because the acceleration of gravity on the Moon is $\sim 1/6$ that on the earth. In these two experiments, the potential energy at the maximum height is, respectively, U_e and U_m. What is the relationship between U_e and U_m?
(A) $U_e = U_m$
(B) $U_e = \sqrt{3}U_m$
(C) $U_e = 6U_m$
(D) $U_e = \frac{1}{\sqrt{6}}U_m$
(E) $U_e = \frac{1}{6}U_m$
(F) $U_e = 36U_m$

3. A 1 kg projectile is fired (on Earth) with a speed of 10 m/s, at an angle 60^o above the horizontal. It is subject to gravity, but not friction. Which of the following is the best estimate of its speed when it reaches a point 3 meters higher than the initial position?

A) 8.5 m/s
B) 6.3 m/s
C) 2.0 m/s
D) 1.1 m/s