Name _____ Section _____

ES201
Examination II
October 13, 1998

Problem	Score
1	/20
2	/30
3	/20
4	/30
Total	/100

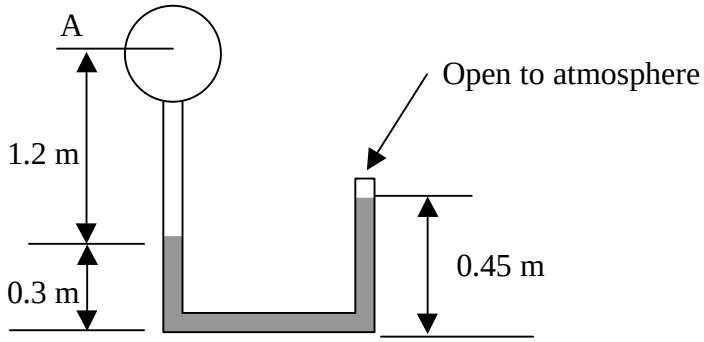
Show all work for credit
AND
Turn in your signed help sheet

Name _____ 20 pts

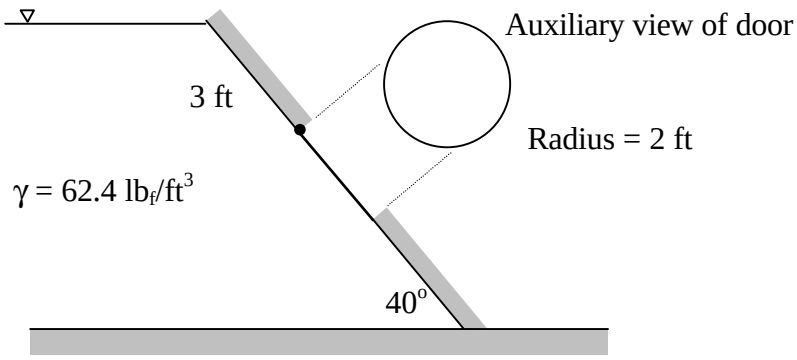
ES201 Examination II **Problem 1** Oct. 13, 1998

A. (Atmospheric pressure is 101.5 kPa.) A product testing chamber experiences a vacuum pressure of 16.2 kPa. What is the absolute pressure? (4 pts)

B. Pipe A contains air. The specific weight of the fluid in the manometer is 10 kN /m^3. Give both gage and absolute pressure in pipe A. (6 pts)



C. For the circular door shown
   a. What is the magnitude of the hydrostatic resultant force?
   b. At what depth does the center of pressure lie beneath the surface (that is, what is the vertical distance from where the resultant hydrostatic force acts to the surface of the fluid)? (10 pts)



Name _____ 30 pts

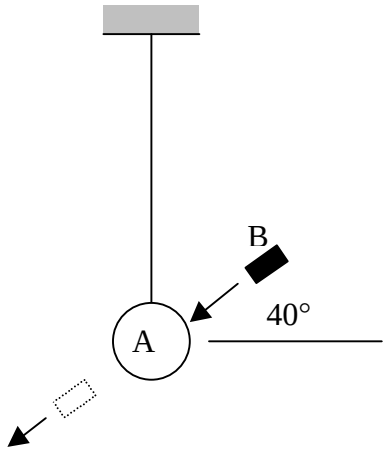
ES201 Examination II **Problem 2** Oct. 13, 1998

A bullet with a mass of 10 g is fired through a sphere of mass 0.5 kg. The speed of the bullet before the impact is 350 m/s and exits with a speed of 40 m/s. Assume the bullet enters and leaves at approximately 40 degrees with respect to horizontal as shown. Assume the wire connecting A to the ceiling is inextensible so that A must have a velocity in the negative x-direction immediately after impact.

Determine:

a) The velocity of A after the impact

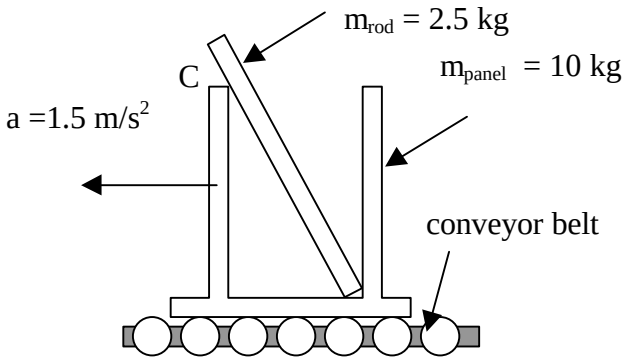
b) The impulse in the wire during the impact.



Name _____ 20 pts

ES201 Examination II **Problem 3** Oct. 13, 1998

A conveyor system is fitted with vertical panels, and a 0.5 m rod AB of mass 2.5 kg is lodged between the panel as shown. Assume all the surfaces are smooth. Knowing the acceleration of the panel and the rod is 1.5 m/s^2 to the left determine the force at point C.



Name _____ 30 pts

ES201 Examination II **Problem 4** Oct. 13, 1998

A nozzle shown discharges water at a rate of 1 m^3/s. Knowing that at both B and C the water moves with a velocity of magnitude 30 m/s, and neglecting the weight of the vein, determine the forces and moment that must be applied at A to hold the vane in place. (γ_{H_2O} = 9.81 kN/m^3)