CE 3305 Engineering Fluid Mechanics
Exercise Set 4
Summer 2018 – GERMANY

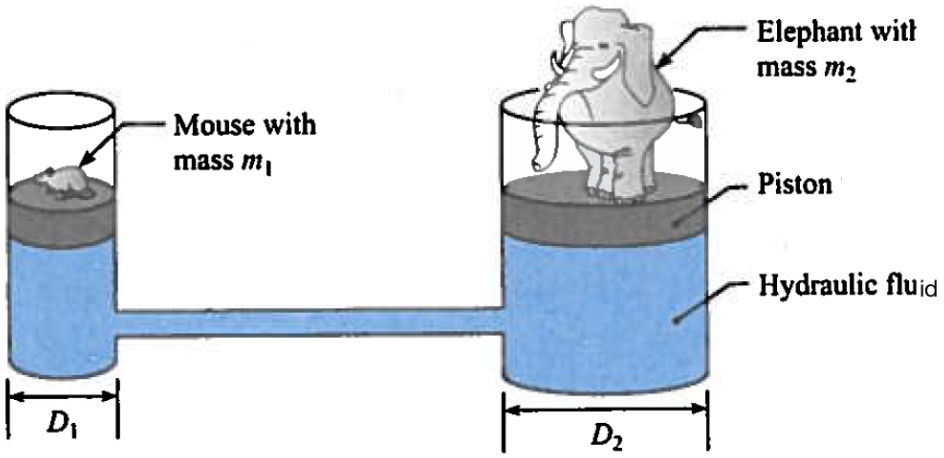
Purpose : Practice concepts of Dalton's law, pressure, and force in a hydraulic system. Apply concept of density and hydrostatic pressure in different fluids.
Assessment Criteria : Completion, plausible answers, use of **R** as a calculator.

Exercises

1. (Problem 3.7 pg 95) Figure 1 is a schematic of a hydraulic machine lifting an elephant using the weight of a mouse.

   a) Derive an algebraic equation that gives the mechanical advantage of the hydraulic machine shown. Neglect piston friction and piston mass.

   b) A mouse can have a mass of 25 grams while an elephant can have a mass of 7500 kilograms. Determine the values of D_1 and D_2 so that a mouse can support an elephant.



PROBLEM 3.7

Figure 1: Mechanical advantage using a hydraulic jack – or a mouse supports a heffalump!

2. (Problem 3.10 pg 95) Imagine two tanks (both open to air). Tank A is filled to a depth h with water. Tank B is filled to a depth h with oil.

   a) Which tank has the largest pressure?

   b) Why?

   c) Where in the tank does the largest pressure occur?