Assignment 12

PHY1001

NO LATE SUBMISSION IS ACCEPTED

2 In Fig. 14-21, the fresh water behind a reservoir dam has depth $D = 12$ m. A horizontal pipe 4.0 cm in diameter passes through the dam at depth $d = 6.0$ m. A plug secures the pipe opening. (a) Find the magnitude of the frictional force between plug and pipe wall. (b) The plug is removed. What water volume exits the pipe in 3.0 h?

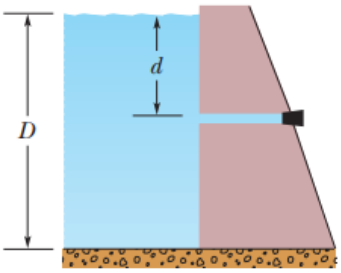

Figure 14-21 Problem 2.

30 In Fig. 14-33, a spring of spring constant 3.75×10^4 N/m is between a rigid beam and the output piston of a hydraulic lever. An empty container with negligible mass sits on the input piston. The input piston has area A_i, and the output piston has area $18.0A_i$. Initially the spring is at its rest length. How many kilograms of sand must be (slowly) poured into the container to compress the spring by 5.00 cm?

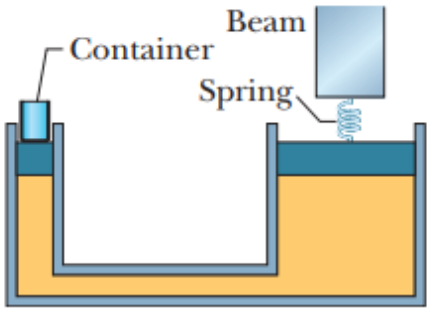

Figure 14-33 Problem 30.

33 A hollow spherical iron shell floats almost completely submerged in water. The outer diameter is 50.0 cm, and the density of iron is 7.87 g/cm^3. Find the inner diameter.

38 The L-shaped fish tank shown in Fig. 14-37 is filled with water and is open at the top. If $d = 7.0$ m, what is the (total) force exerted by the water (a) on face A and (b) on face B?

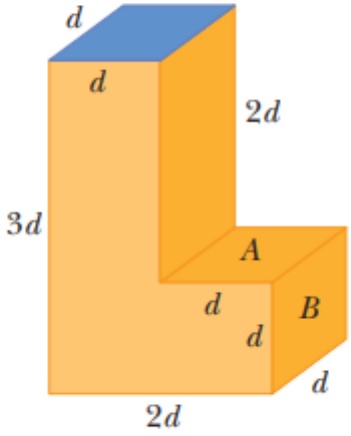

Figure 14-37
Problem 38.

43 The water flowing through a 1.9 cm (inside diameter) pipe flows out through three 1.5 cm pipes. (a) If the flow rates in the three smaller pipes are 26, 21, and 16 L/min, what is the flow rate in the 1.9 cm pipe? (b) What is the ratio of the speed in the 1.9 cm pipe to that in the pipe carrying 26 L/min?

57 In Fig. 14-42, water flows through a horizontal pipe and then out into the atmosphere at a speed $v_1 = 23.0$ m/s. The diameters of the left and right sections of the pipe are 5.00 cm and 3.00 cm. (a) What volume of water flows into the atmosphere during a 20.0 min period? In the left section of the pipe, what are (b) the speed v_2 and (c) the gauge pressure?

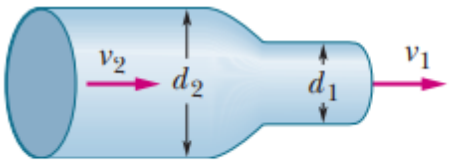

Figure 14-42 Problem 57.