Florida International University
Department of Civil and Environmental Engineering

CWR 3201 Fluid Mechanics
Fall 2018
Instructor: Arturo S. Leon, Ph.D., P.E., D.WRE

Homework Assignment 2
*Mechanics of Fluids (**Fifth edition**), by M.C. Potter, D.C. Wiggert and B.H. Ramadan.*

1. 2.33 (same number in *Fourth edition*)

   For the setup shown in Fig. P2.33, find the difference in pressure between the oil pipe and the water pipe.

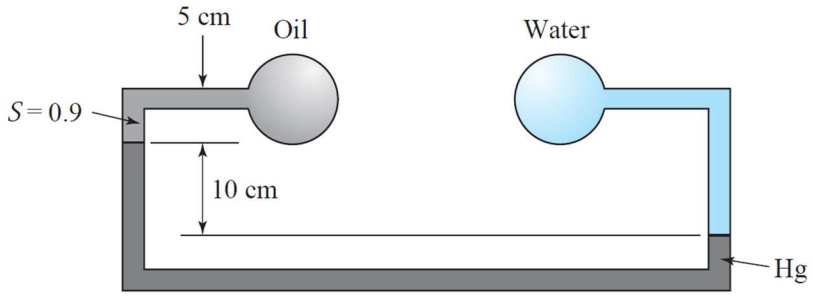

Fig. P2.33

2. 2.38 (same number in *Fourth edition*)

   For the tank shown in Fig. P2.38, if $H = 16$ cm, what will the pressure gage read?

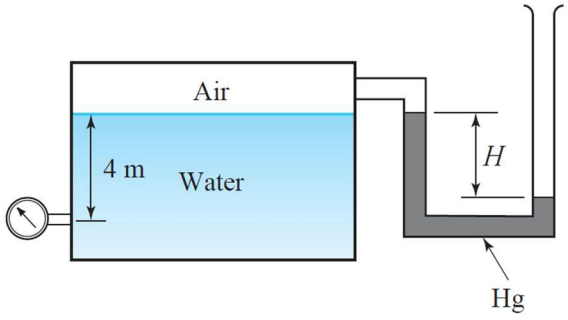

Fig. P2.38

3. 2.57 (same number in *Fourth edition*)

Calculate the force P necessary to hold the 4-m-wide gate in the position shown in Fig. P2.57 if:

(a) $H = 6$ m **(b)** $H = 8$ m

(c) $H = 10$ m

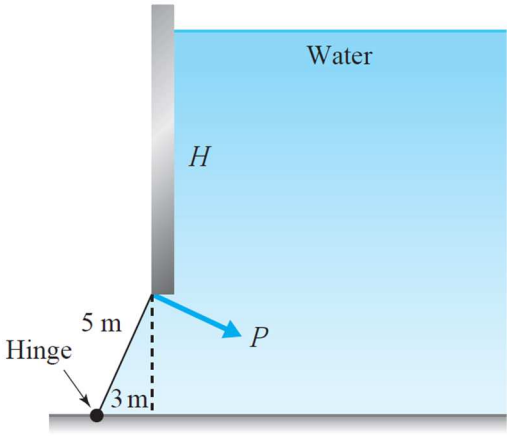

Fig. P2.57

4. 2.63 (same number in *Fourth edition*)

For the gate shown in Fig. P2.63, calculate the height H that will result in the gate opening automatically if (neglect the weight of the gate):

(a) $l = 2$ m **(b)** $l = 1$ m **(c)** $l = 6$ ft **(d)** $l = 3$ ft

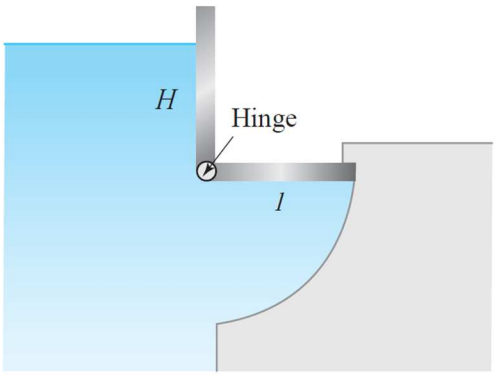

Fig. P2.63

5. 2.74 (same number in *Fourth edition*)

The quarter-circle cylindrical gate (Fig. P2.74, $S = 0.2$) is in equilibrium, as shown. Calculate the value of γ_x using:

(a) SI units

(b) English units

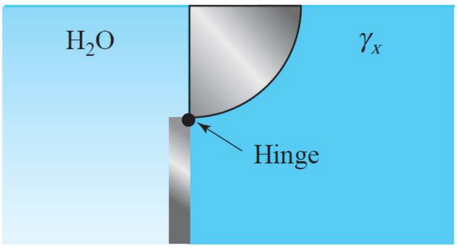

Fig. P2.74

6. 2.77 part b (same number in *Fourth edition*)

Find the force P if the parabolic gate shown in Fig. P2.77 is:

(b) 4 ft wide and $H = 8$ ft

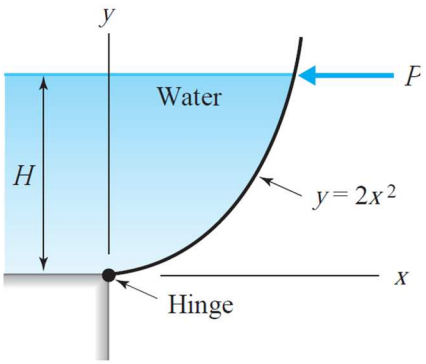

Fig. P2.77

7. 2.81 (same number in *Fourth edition*)

A 30-m-long vessel, with cross section shown in Fig. P2.81, carries a load of 6000 kN. How far will the water level be from the top of the vessel if its mass is 100 000 kg?

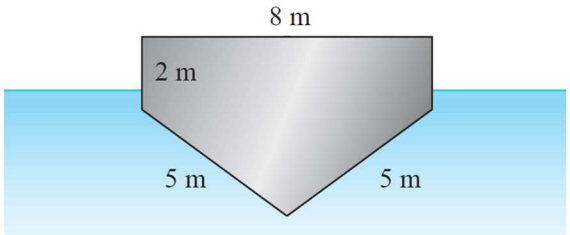

Fig. P2.81

8. 2.95 (same number in *Fourth edition*)

Is the symmetrically loaded barge shown in Fig. P2.95 stable? The center of gravity of the barge and load is located as shown.

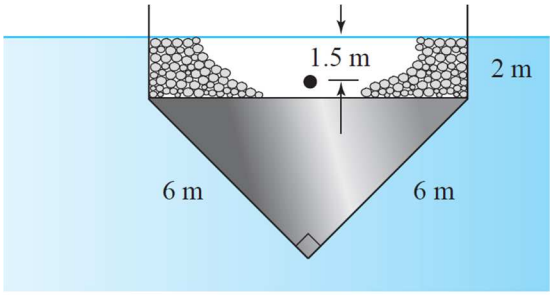

Fig. P2.95

9. 2.102 parts a, b, c (same number in *Fourth edition*)

For the U-tube shown in Fig. P2.102, determine the pressure at points A, B, and C if:

(a) $a_x = 0, a_z = 10$ m/s^2, $L = 60$ cm

(b) $a_x = 20$ m/s^2, $a_z = 0$, $L = 60$ cm

(c) $a_x = 20$ m/s^2, $a_z = 10$ m/s^2, $L = 60$ cm

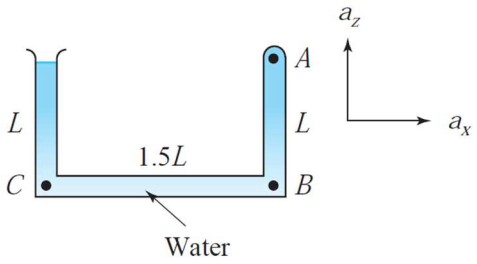

Fig. P2.102

10. 2.103 (same number in *Fourth edition*)

The U-tube of Problem 2.102 is rotated about the left leg at 50 rpm. Find p_A, p_B, and p_C if:

(a) $L = 60$ cm **(b)** $L = 40$ cm

11. 2.106 part d (same number in *Fourth edition*)

For the cylinder shown in Fig. P2.106, determine the pressure at point A for a rotational speed of:

(d) 20 rad/s

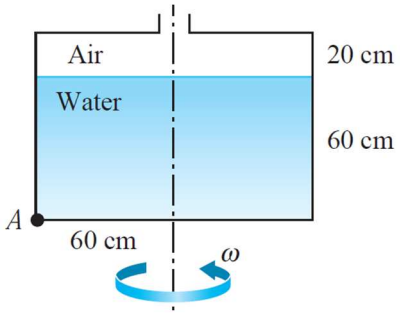

Fig. P2.106