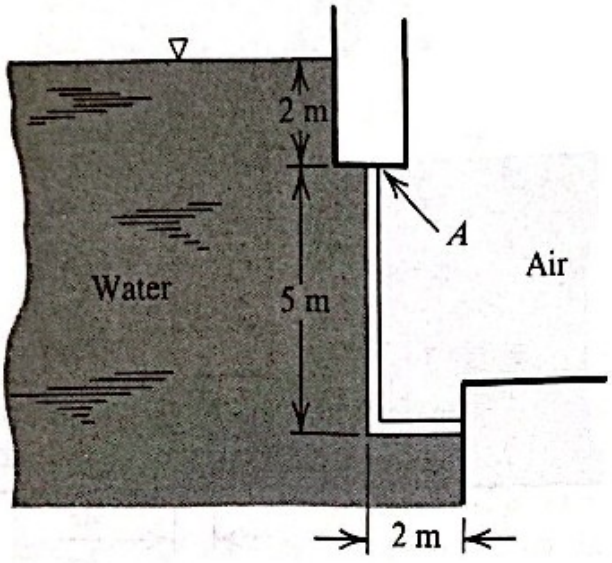

Figure P3.69

3.69 An L-shaped flat plate holds back a large quantity of water, as shown in Fig. P3.69. Find the moment about A due to (a) the water on the 5 m length and (b) the water on the 2 m length. The plate is 5 m wide.

3.71 The coffer dam shown in Fig. P3.71 supports a 1 ft head of water in a pressurized chamber on one side and 2 ft of oil on the other. (a) What is the force per foot of length on the water side of the dam if the chamber is pressurized to 100 psi? (b) What must the pressure be at B to keep the gate closed?

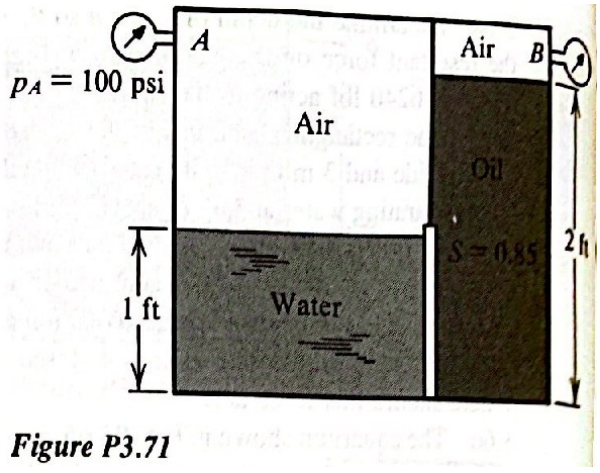

Figure P3.71

3.77 A series of gates keep various fluids separated. Consider the two gates separating three fluids shown in Fig. P3.77. If each gate is 1 m wide, calculate the heights h_1 and h_2 to keep the gates closed.

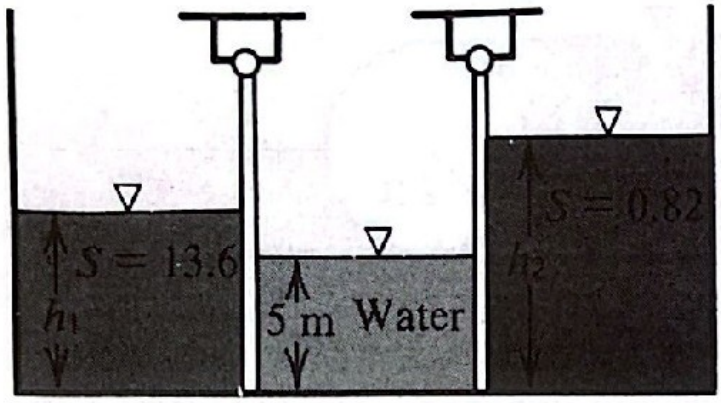

Figure P3.77

3.84 A large metal tank with an irregular shape is used to study predatory fish behavior patterns (Fig. P3.84). A hemispherical window, *G-H*, is used to view the fish. The tank has a width of 10 ft. The specific gravity of the seawater in the tank is 1.023. The gauge pressure at point *A* is 672 lbf/ft^2. Find (a) the pressure at point *E* expressed in feet of seawater, (b) the force on the top surface of tank (*B-C-D-E-F*), (c) the vertical force acting on the hemispherical surface *G-H* as a result of the water pressure, and (d) the horizontal force acting on the hemispherical surface *G-H* as a result of the water pressure.

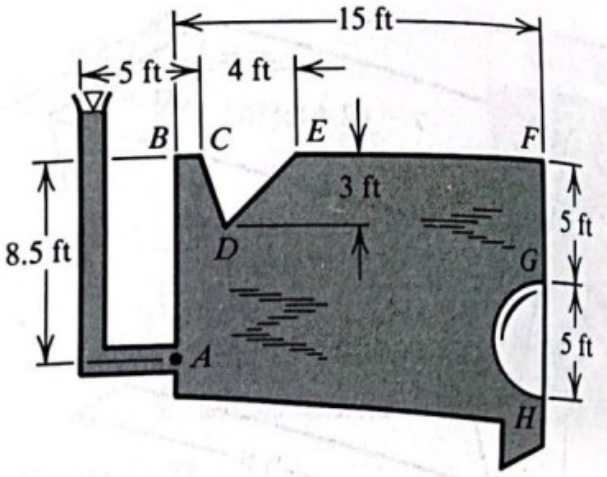

Figure P3.84

3.88 An S-shaped gate consisting of two quarter circles each of radius 3 ft, rotate about point O in Fig. P3.88. Calculate the horizontal and vertical force per unit width required to keep the gate shut (neglect any friction).

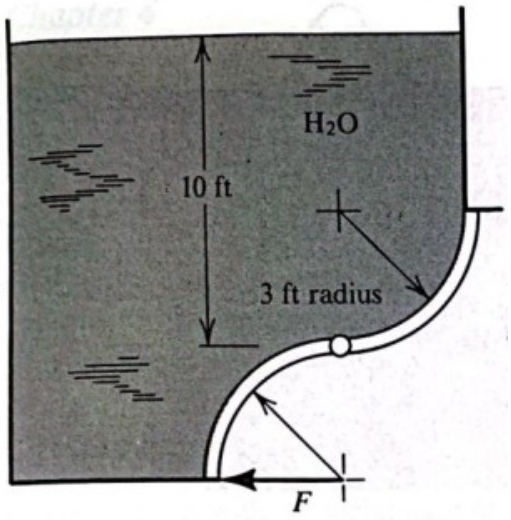

Figure P3.88