Sheet 3

1. A swimming pool is 18 m long and 7 m wide. Determine the location of the resultant force of the water on the vertical end of the pool where the depth is 2.5 m.

2. A vertical triangular gate with water on one side is shown 2-1. Find the total resultant force acting on the gate and locate the center of pressure.

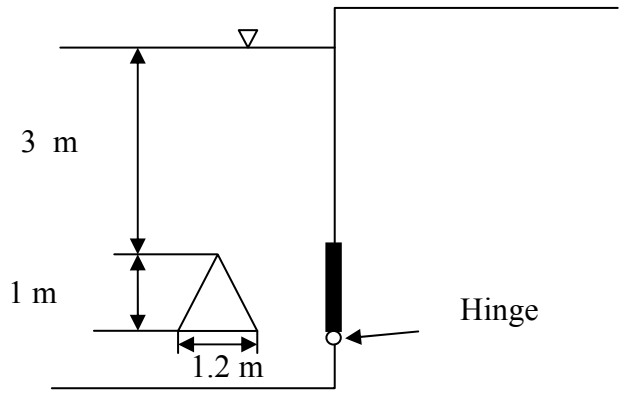

Figure 2-1

3. An inclined rectangular gate with water on one side is shown 2-2. Find the total resultant force acting on the gate and locate the center of pressure.

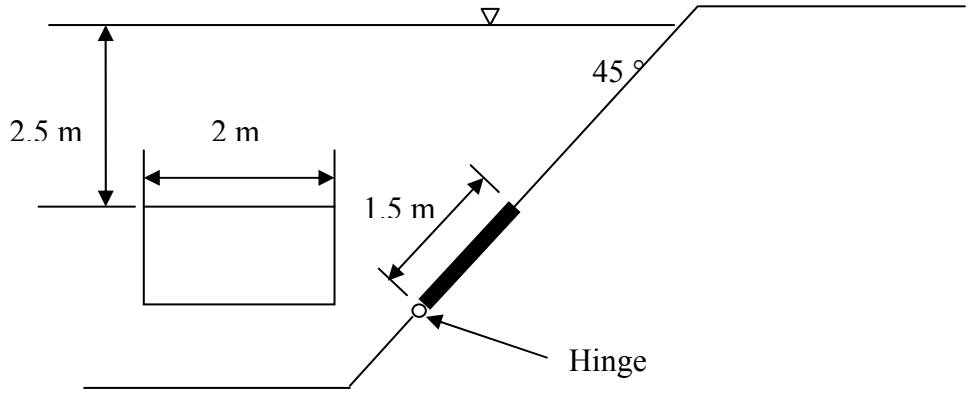

Figure 2-2

4. A rectangular gate having a width of 1.5 m is located in sloping side of a tank as shown in figure 2-3. The gate is hinged along its top edge and is held in position by the force (P). Friction at the hinge and the weight of the gate can be neglected. Determine the required value of (P).

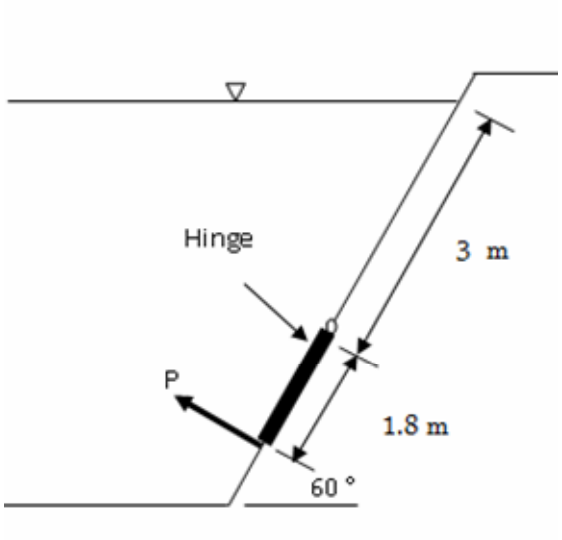

Figure 2-3

5. A gate having the triangular shape shown in figure 2-4 is located in the vertical side of an open tank. The gate is hinged about the horizantal axis AB. The force of the water on the gate creates a moment with respect to the axis AB. Determine the magnitude of the moment.

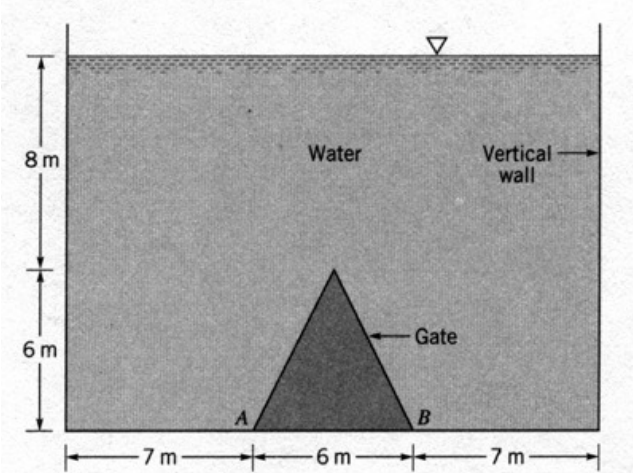

Figure 2-4

6. A homogeneous, 1.2 m wide, 2.4 m long rctangular gate weighing 3.56 KN is held in place by horizantal flexible cable as shown in figure 2-5. Water acts against the gate which is hinged at point A. Friction in the hinge is negligible. Determine the tension in the cable

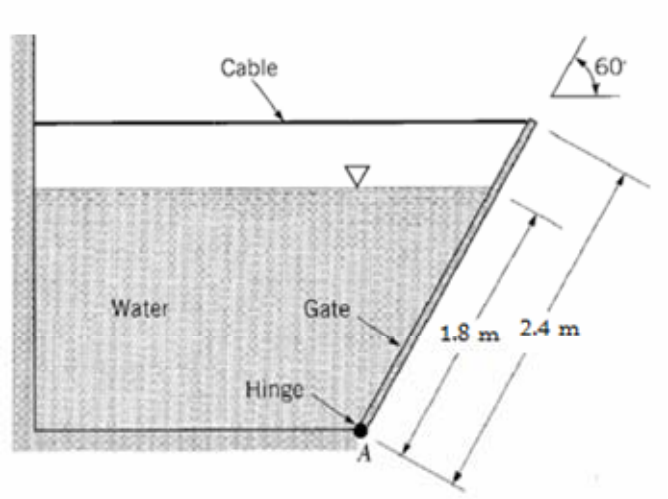

Figure 2-5

7. The rectangular gate CD of figure 2-6 is 1.8 m wide and 2.0 m long. Assuming the material of the gate is to be homogeneous and neglecting friction at the hinge C, determine the weight of the gate necessary to keep it shut untill the water level is 2 m above the hinge.

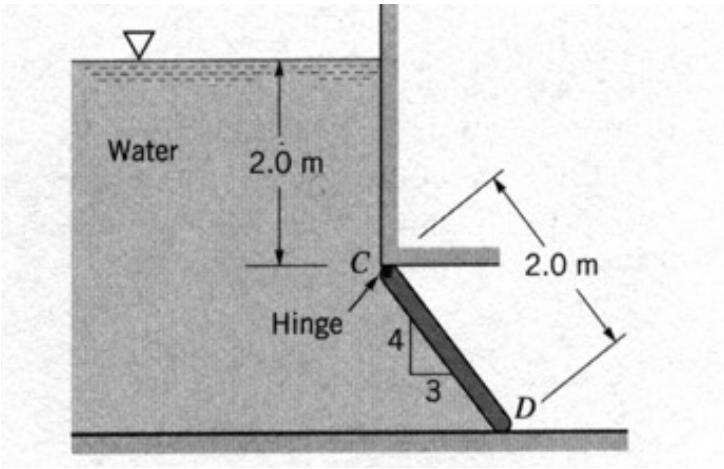

Figure 2-6

8. The rigid gate, *OAB*, of figure 2-7 is hinged at *O* and rests against a rigid support at B. What minimum horizantal force, *P*, is required to hold the gate closed if its width is 3 m. Neglect the weight of the gate and friction at its hinge.

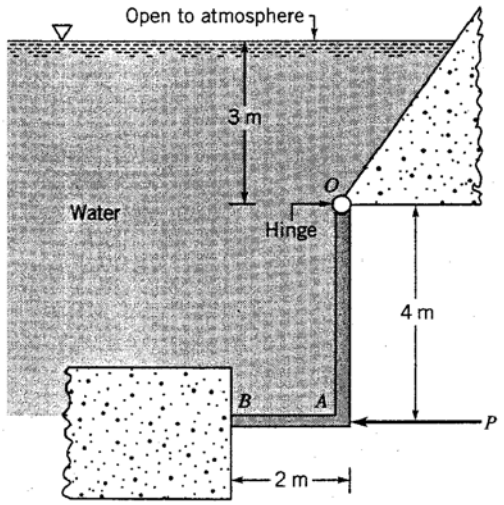

Figure 2-7

9. The massless, 1.2 m wide gate shown in figure 2-8 pivots about the frictionless hinge (*O*). It is held in place by the 8.9 KN counter weight, (*W*). Determine the water depth, (*h*).

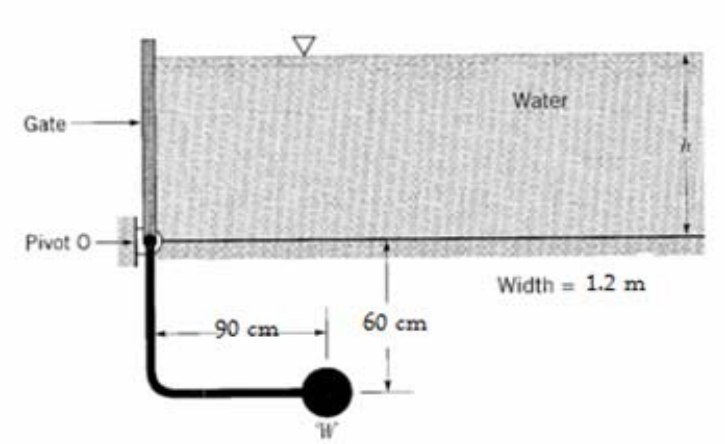

Figure 2-8

10. An open tank has a vertical partition and on one side contains gasoline with density 700 kg/m^3 at depth of 4 m, as shown in figure 2-9. A rectangular gate that is 4 m high and 2 m wide and hinged at one end is located in the partition. Water is slowly added to the empty side of the tank. At what depth, (*h*) will the gate start to open?

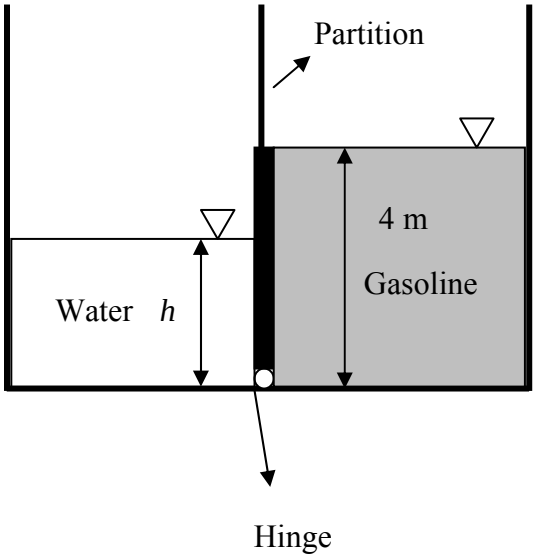

Figure 2-9

11. The 6 m-long gate of figure 2-10 is a quarter circle and is hinged at *H*. Determine the horizantal force, P, required to hold the gate in place. Neglect friction at the hinge and the weight of the gate.

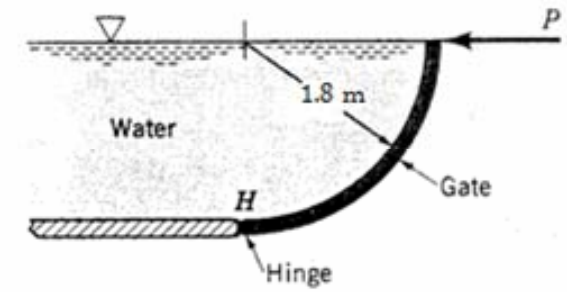

Figure 2-10

12. A gate in the form of a partial cylinder surface (called a Tainter gate) holds back water on top of a dam as shown in figure 2-11. The radius of the surface is 6.7 m, and its length is 11 m. The gate can pivot about point *A*, and the pivot point is 3 m above the seat, *C*. Determine the magnitude and resultant water force on the gate. Will the resultant pass through the pivot? Explain.

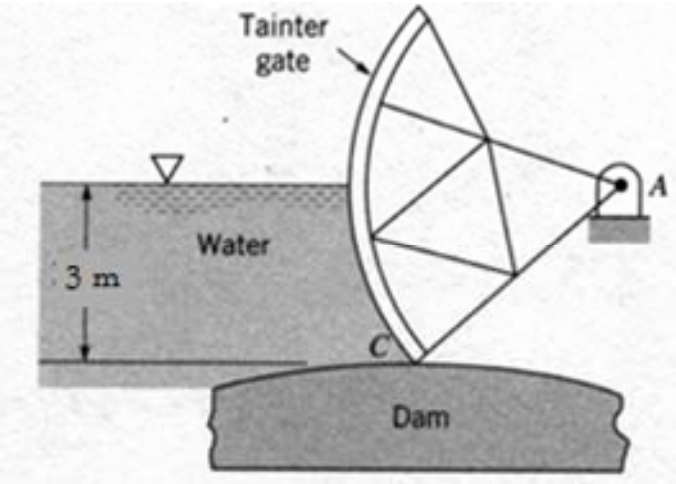

Figure 2-11