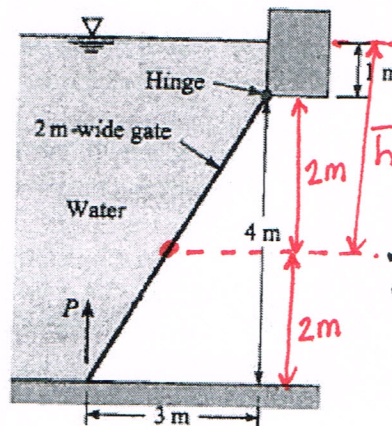


## CE 3305 Fluid Mechanics

## Quiz 6

Spring 2014

1. Determine the magnitude of the pressure force on the 2m-wide gate in Figure 1.

KNOWN

$$\gamma = \rho g = 9800 \text{ N/m}^3$$

GOVERNING EQN:

$$P = \rho g \bar{h}$$

FIND:

$$F_p = PA$$

Figure 1: Elevation view of discharge gate.

SOLUTION:

$$P = \gamma \bar{h}$$

$$\bar{h} = 3\text{m (from geometry)}$$

Distance from surface of centroid of Plate.

$$P = \frac{9800 \text{ N}}{\text{m}^3} (3\text{m}) = 29,400 \frac{\text{N}}{\text{m}^2}$$

$$F = PA = 29,400 \frac{\text{N}}{\text{m}^2} (2\text{m})(5\text{m}) = 294,000 \text{ N}$$

$$= \boxed{294 \text{ kN}}$$