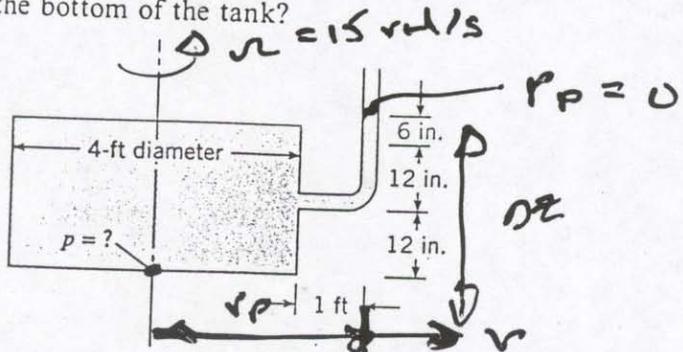**5.25** This closed tank, which is 4 ft in diameter, is filled with water and is spun around its vertical centroidal axis at a rate of 15 rad/s. An open piezometer is connected to the tank as shown so that it is also rotating with

the tank. For these conditions, what is the pressure at the center of the bottom of the tank?

PROBLEM 5.25

$$p + \gamma z - \frac{\rho r^2 \omega^2}{2} = p_p + \gamma z_p - \rho \frac{r_p^2 \omega^2}{2}$$

$$p + \gamma z = \gamma z_p - \frac{\rho r_p^2 \omega^2}{2}$$

$$p = \gamma (z_p - z) - \frac{\rho r_p^2 \omega^2}{2}$$

$$p = -\frac{1.94}{2} \left(3^2 \cdot 15^2\right) + 62.4\,(2.5)$$

$$= -1964 + 156$$

$$= -1808 \; psf = -12.56 \; psi$$