

25. (a) The anchor is completely submerged in water of density  $\rho_w$ . Its effective weight is  $W_{\text{eff}} = W - \rho_w g V$ , where  $W$  is its actual weight ( $mg$ ). Thus,

$$V = \frac{W - W_{\text{eff}}}{\rho_w g} = \frac{200 \text{ N}}{(1000 \text{ kg/m}^3)(9.8 \text{ m/s}^2)} = 2.04 \times 10^{-2} \text{ m}^3 .$$

- (b) The mass of the anchor is  $m = \rho V$ , where  $\rho$  is the density of iron (found in Table 15-1). Its weight in air is

$$W = mg = \rho V g = (7870 \text{ kg/m}^3)(2.04 \times 10^{-2} \text{ m}^3)(9.8 \text{ m/s}^2) = 1.6 \times 10^3 \text{ N} .$$