26. (a) The pressure (including the contribution from the atmosphere) at a depth of $h_{top} = L/2$ (corresponding to the top of the block) is

$$p_{top} = p_{atm} + \rho g h_{top} = \left[1.01\times10^5 + (1030)(9.8)(0.300)\right]\text{Pa} = 1.04\times10^5 \text{ Pa}$$

where the unit Pa (Pascal) is equivalent to N/m^2. The force on the top surface (of area $A = L^2 = 0.36$ m^2) is $F_{top} = p_{top}A = 3.75\times10^4$ N.

(b) The pressure at a depth of $h_{bot} = 3L/2$ (that of the bottom of the block) is

$$p_{bot} = p_{atm} + \rho g h_{bot} = \left[1.01\times10^5 + (1030)(9.8)(0.900)\right]\text{Pa} = 1.10\times10^5 \text{ Pa}$$

where we recall that the unit Pa (Pascal) is equivalent to N/m^2. The force on the bottom surface is $F_{bot} = p_{bot}A = 3.96\times10^4$ N.

(c) Taking the difference $F_{bot} - F_{top}$ cancels the contribution from the atmosphere (including any numerical uncertainties associated with that value) and leads to

$$F_{bot} - F_{top} = \rho g\,(h_{bot} - h_{top})\,A = \rho g L^3 = 2.18\times10^3 \text{ N}$$

which is to be expected on the basis of Archimedes' principle. Two other forces act on the block: an upward tension T and a downward pull of gravity mg. To remain stationary, the tension must be

$$T = mg - (F_{bot} - F_{top}) = (450 \text{ kg})(9.80 \text{ m/s}^2) - 2.18\times10^3 \text{ N} = 2.23\times10^3 \text{ N}.$$

(d) This has already been noted in the previous part: $F_b = 2.18\times10^3$ N, and $T + F_b = mg$.