Answer on Question#38860 – Physics – Other

If the weight of stone in air is 70 N, weight of same stone in tap water 60 N and in salty water is 50 N, then find volume of the object?

Solution:

$P = 70\text{N} - \text{weight of stone in air}$

$\rho_t = 1000\frac{\text{kg}}{\text{m}^3} - \text{density of tap water;}$

$P_t = 60\text{N} - \text{weight of stone in tap water}$

$\rho_s = 1025\frac{\text{kg}}{\text{m}^3} - \text{density of salty water;}$

$P_s = 50\text{N} - \text{weight of stone in salty water}$

Newton's second law for a stone in the air:

$$P = mg = 70\text{N} \qquad (1)$$

Newton's second law for a stone in the in tap water:

$$P_t = mg - \rho_t gV \qquad (2)$$

(1) in (2):

$$V = \frac{P_t - mg}{\rho_t g} = \frac{P - P_t}{\rho_t g} = \frac{P - P_t}{\rho_t g} = \frac{70\text{N} - 60\text{N}}{9.8\frac{\text{N}}{\text{kg}} \cdot 1000\frac{\text{kg}}{\text{m}^3}} = 1020\ \text{cm}^3$$

Answer: volume of the object is equal to $1020\ \text{cm}^3$.