Answer on Question #71162-Physics-Mechanics-Relativity

1. Solution a empty glass test tube is floated vertically in water depth 5 cm.
2. Now on introducing a 8 cm liquid column in the tube its depth water is further increase by 4 cm.
3. Now if the empty test tube is allow to float vertically in liquid 5cm of the tube is seen in air, find the total length of the tube

Solution

1.

$$\rho_T gAh = \rho_{Water}gA(5)$$

$$\rho_T = \frac{5\rho_{Water}}{h}.$$

2.

$$\rho_L gA(8) = \rho_{Water}gA(4)$$

$$\rho_L = \frac{1}{2}\rho_{Water}.$$

3.

$$\rho_T gAh = (h-5)\rho_L gA$$

$$\frac{5\rho_{Water}}{h}gAh = (h-5)\frac{1}{2}\rho_{Water}gA$$

$$5 = (h-5)\frac{1}{2}$$

$$h - 5 = 10$$

$$h = 15 \; cm.$$

Answer: 15 cm.