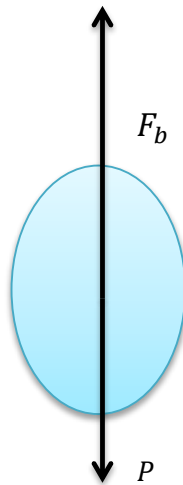


Answer on Question#37651, Physics, Other

Question:

A balloon is released from a tall building. The total mass of the balloon including the enclosed gas is 2.0 kg. Its volume is 5.0 m³. The density of air is 1.3 kg/m³. Will the balloon rise, fall, or remain stationary; and why?

Answer:



where F_b is upward buoyant force, P – weight.

buoyant force equals (assuming Archimedes' principle):

$$F_b = \rho_a g V = 1.3 \frac{\text{kg}}{\text{m}^3} 9.8 \frac{\text{m}}{\text{s}^2} 5 \text{ m}^3 = 63.7 \text{ N}$$

where ρ_a is density of air, V is volume of the balloon

weight of the balloon equals:

$$P = mg = 2 \text{ kg} * 9.8 \frac{\text{m}}{\text{s}^2} = 19.6 \text{ N}$$

where m is total mass of the balloon.

So, we have $F_b > P$, therefore the balloon rise.

Answer: the balloon rise.