

Answer on Question 57433, Physics, Atomic and Nuclear Physics

Question:

Find the apparent weight of a 18 kilogram lead block submerged into the dead sea.

Solution:

Let's find the volume of the lead block:

$$V_{block} = \frac{m_{block}}{\rho_{lead}} = \frac{18kg}{11340 \frac{kg}{m^3}} = 0.0016m^3.$$

Then the mass of water displaced by the lead block would be:

$$m_{water} = \rho_{dead\ sea} V_{block} = 0.0016m^3 \cdot 1240 \frac{kg}{m^3} = 1.98kg.$$

So, the apparent mass of the lead block in water will be:

$$m_{app} = m_{block} - m_{water} = 18kg - 1.98kg = 16.02kg.$$

Finally, we can calculate the apparent weight of the lead block:

$$W_{app} = m_{app}g = 16.02kg \cdot 9.8 \frac{m}{s^2} = 157N.$$

Answer:

$$W_{app} = 157N.$$