

When a polar bear on an iceberg notices that his 1870 N weight is just sufficient to sink the iceberg-?

WHAT IS THE WEIGHT OF THE ICEBERG?

Solution:

Let:

$$P = 1870N$$

$$\rho(w) = 1000 \text{ kg/m}^3 - \text{density of water}$$

$$\rho(i) = 916.7 \text{ kg/m}^3 - \text{density of ice}$$

m -?

According to Archimedes' principle:

$$P = \rho(w)gV - \rho(i)gV, \text{ where } V - \text{volume of iceberg, } g = 9.8 \text{ m/s}^2$$

$$P = Vg(\rho(w) - \rho(i))$$

$$P = \frac{m}{\rho(i)}g(\rho(w) - \rho(i))$$

$$m = \frac{P \cdot \rho(i)}{g(\rho(w) - \rho(i))}$$

$$m = \frac{1870 \cdot 916.7}{9.8 \cdot (1000 - 916.7)} = 2099.9 \text{ kg}$$

Answer: 2099.9 kg.