Answer on Question #55871-Physics-Astronomy-Astrophysics

A sphere of mass 40 kg is attracted by another sphere of mass 15 kg with a force of 1/10 mg wt. find the value of constant of gravity if centers of spheres are 20 cm apart

Solution

$$m_1 = 40\ kg;\ m_2 = 15\ kg; r = 0.2\ m.$$

$$F = \frac{1}{10} mg\ wt = \frac{1}{10} \cdot 10^{-3} g\ wt = \frac{1}{10} \cdot 10^{-6} kg\ wt = 10^{-7} kg\ wt = 9.8 \cdot 10^{-7} N.$$

As

$$F = G\frac{m_1 m_2}{r^2}$$

$$G = \frac{Fr^2}{m_1 m_2} = \frac{9.8 \cdot 10^{-7}(0.2)^2}{40 \cdot 15} \frac{Nm^2}{kg^2} = 6.533 \cdot 10^{-11} \frac{Nm^2}{kg^2}$$

Answer: $\mathbf{6.533 \cdot 10^{-11} \frac{Nm^2}{kg^2}}$.