

Chapter 10

GRAVITATION

EXAMPLE- 2:

The mass of a ball is four times the mass of the another ball. When these balls are seperated by a distance of 10 cm, the force of gravitation between them is $6.67 \times 10^{-7} N$, find the masses of the two balls.

Solution:

Given, $m_1 = m_1, m_2 = 4m_1, d = 10\text{cm} = 10 \times 10^{-2} \text{m}; d = 10^{-1} \text{m}$

$$F = 6.67 \times 10^{-7} N \text{ and } G = 6.67 \times 10^{-11} \text{Nm}^2 / \text{kg}^2$$

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

$$6.67 \times 10^{-7} = \frac{6.67 \times 10^{-11} \times m_1 \times 4m_1}{(10^{-1})^2}$$

$$4m_1^2 = 100$$

$$m_1^2 = 25$$

$$m_1 = 5 \text{ and}$$

$$m_2 = 4m_1$$

$$\Rightarrow m_2 = 20 \text{ kg} .$$