Chapter 10

GRAVITATION

EXAMPLE- 3:

Two particles of masses 1 kg and 2 kg are placed at a seperation of 50 cm. Assuming that only gravitational forces acting on the particles mutually, the initial acceleration of the first particle.

Solution:

Given, $m_1 = 1\,kg$; $m_2 = 2\,kg$

$d = 50\,cm = 50 \times 10^{-2}\ m = 5 \times 10^{-1} m$

And $G = 6.67 \times 10^{-11}\ Nm^2 / kg^2$

$$F = \frac{Gm_1m_2}{d^2} = \frac{6.67 \times 10^{-11} \times 1 \times 2}{\left(5 \times 10^{-1}\right)^2}$$

$F = 5.3 \times 10^{-10}\ N$

The acceleration of 1 kg particle is $F = m_1a_1$

$$a_1 = \frac{F}{m_1} = \frac{5.3 \times 10^{-10}}{1} = 5.3 \times 10^{-10}\ m/s^2$$

It is towards the 2 kg particle.