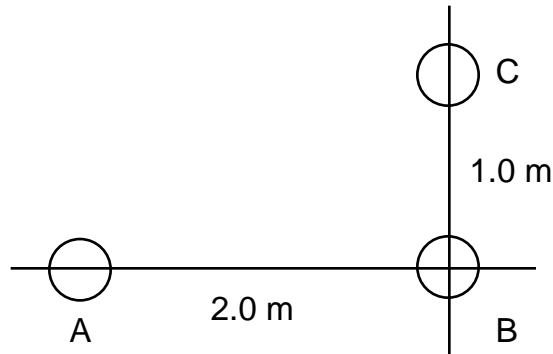


Gravity : Quiz-45

Data on Mars: Mass = 6.58×10^{23} kg, Radius = 3.38×10^6 m, Orbit Radius = 2.25×10^{11} m.

- 1)a) Find the weight of a 5.0 kg mass on the Earth's surface.
- b) Find the weight of the above mass at a distance of 4.0 Earth radii from the Earth's center.
- 2) Find the force of attraction between the Earth and the Sun.
- 3) Find the magnitude of the force of gravity on mass B. All three bodies have a mass of 10. kg.



- 4) Find g (acceleration due to gravity) at the surface of Mars.
- 5) Kepler's Third Law states that:

$$\frac{R^3}{T^2} = \text{constant}$$

- a) Show how Newton proved this law.
- b) What is the value of the constant for satellites moving around the Earth?
- c) A geosynchronous satellite above Earth has a period of one day. Find the distance from the Earth's center.

Answers: 1)a) 49N, b) 3.1N, 2) 3.5×10^{22} N, 3) 6.9×10^{-9} N, 4) 3.9 m/s^2 ,
5)a) $\{GMm/R^2\} = \{4\pi^2mR/T^2\} \rightarrow \{GM/(4\pi^2)\} = \{R^3/T^2\}$, b) 1.0×10^{13} , c)
 4.2×10^7 m.