Question

What is the value of acceleration due to gravity at height equal to half the radius of earth from surface of earth. [take g = $10 m/s^2$ at earth surface]

Solution

Let the radius of earth from surface of earth is R and the height equal to half the radius of earth from surface of earth is h. The acceleration on the surface of earth due to gravity is given as,

$$g = \frac{GM}{R^2}$$

The acceleration at a height due to gravity is given as,

$$g' = \frac{GM}{h^2}$$

$$= \frac{GM}{\left(\frac{R}{2}\right)^2}$$

$$= 4g$$

$$= 4 \times 10$$

$$= 40\ m/s^2$$

Thus, the value of acceleration at a height due to gravity is 40 m/s^2.