Question

If the radius of earth were to shrink by one percent, its mass remaining the same, the acceleration due to gravity on the earth's surface would

A decrease

B remain unchanged

C increase

D nothing will happen

Solution

Correct option is C)

The acceleration due to gravity is given by:

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

$$\Rightarrow g \propto \frac{1}{R^2}$$

$$\Rightarrow \frac{\Delta g}{g} = -2\frac{\Delta R}{R} = -2(-0.01) = 0.02$$

So, the value of g increases by 2 percent.